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Discovering telecommunications as an instructional media tool in teaching : training and implementation strategies.

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DISCOVERING TELECOMMUNICATIONS AS AN INSTRUCTIONAL MEDIA TOOL IN TEACHING: TRAINING AND IMPLEMENTATION STRATEGIES

A Dissertation Presented

By

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Dedicated to

My grandchildren, Keith and A.J.,

and their future education.

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ABSTRACT

DISCOVERING TELECOMMUNICATIONS

AS AN INSTRUCTIONAL MEDIA TOOL IN TEACHING:

TRAINING AND IMPLEMENTATION STRATEGIES

SEPTEMBER 1990

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This study tested the effectiveness of an inservice training program for (1) teaching telecommunication skills to teachers who were relatively inexperienced in the use of computers, and (2) assisting teachers in designing and implementing telecommunications activities in their curriculum.

Nine elementary teachers participated in an innovative telecommunications project between two local schools. Three of the teachers completed the four session model training program in which they learned the skills necessary for using a telecommunications Bulletin Board System. During the six-week initial implementation phase, a coaching strategy was employed, in which the teachers were observed and assisted while practicing telecommunications.

The teachers developed a degree of expertise in using telecommunications and they were able to implement this technological innovation in their curriculum as indicated by the activities and impact upon student learning. During the first cycle of use the teachers were

becoming stabilized in the use of telecommunications as they began to refine integration of this media in new areas of their curriculum.

The coaching the teachers received was evaluated as being most helpful in assisting teachers in the implementation process. Perceived future barriers to implementation relate to the lack of phone lines and the scarcity of support assistance in the schools.

This study has considerable implications for policy makers responsible for the incorporation of technological innovations in school curricula. The results indicate that teachers given an extensive system of training and implementation support are able to effectively integrate telecommunications activities in their curriculum.

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CHAPTER I

INTRODUCTION

Background of the Problem

The decade of the '80s has seen a significant and fundamental change in our society, not only in the jobs available but also in our everyday lives, a change brought about by the growth of computers and the advent of the microcomputer. Early in this decade Time magazine devoted its "Man of the Year" issue (January 3, 1983) to the computer's impact on society stating that:

> Several human candidates might have represented 1982, but none symbolized the past year more richly, or will be viewed by history as more significant, than a machine: the computer [Meyers, p. 3].

Our schools, which have the task of preparing students to live in this society, have not kept pace with this rapid change. Today's classrooms look very much like their ancestors of fifty years ago, more so than operating rooms or business offices resemble their 1940 versions. At a time when we are receiving troubling news about American schools, some experts believe the computer can radically change the performance and structure of the educational system. Seymour Papert, speaking on a panel with Alexey Semenov of Moscow on "Computers as Carriers of Social Change," declared that "We need a Perestroika and most urgently in our schools!" [Papert, 1989].

Computers in Education

By 1980, the microcomputer was arriving in schools across the country, and for the first half of the decade schools were scrambling to figure out what to do with them. Some schools put them in closets, but most began by teaching BASIC programming. Then came

the push for computer literacy. Many districts and states began to require credits in "computer literacy" to graduate from high school. As software improved, schools moved from emphasizing programming and literacy courses toward integrating the computer into the total educational curriculum. In fact, the schools have adopted many of the computer uses of business, such as word processing, data bases, spreadsheets, and telecommunications, finding they can be tools for education as well.

The past decade of computer experimentation has generated a knowledge base for schools and educators. The 1988 report from the Office of Technology Assessment (OTA) says that:

> There is a general consensus that the appropriate assignment of new technologies within effectively organized schools could make a big difference in academic performance, motivation, and dedication to learning [U.S. Congress, OTA Report, p. 4].

Telecommunications in Education

Telecommunications is one of the fastest growing areas of technology today. It offers fast access to information resources. In the business world, this form of long distance communication is a standard tool in everyday use, and it offers the same speed of communication and access to resources for the students in our schools. Using a computer, a modem, telecommunications software, and the telephone lines, information can be transferred quickly from one place to another. The potential of this technology as an educational tool in the classroom is generating great interest and activity throughout the world. The International Council for Computers in Education recently established an "Initiative" to:

> provide support for telecommunications applications and other instructional designs for this new use of computers in the schools [Kurshan, 1988].

In this country two of the best known telecommunications projects in education have been the National Geographic Society's Kids Network and the FrEd Mail Network. The Kids Network was developed by the Technical Education Research Center (TERC) in Cambridge, Massachusetts as a science curriculum for grades four through six. In the pilot stage, in which this researcher was involved, classes across the country and a few foreign sites were divided into clusters of ten. Students studied a science unit on acid rain, weather forecasting, water pollution, or food growing. In their study of acid rain, they took pH readings of the acid level of the rainfall in their localities, and each week their findings were sent via telecommunications to the Kids Network computer, from which it was disseminated to the other ten classes in the cluster. The students learned to make predictions about acid rain in the various areas of the country with which they were in communication. Their studies involved more than just science since they also looked up geographic locations of sites on the map and to one another concerning their studies.

The development of the Kids Network was funded by the National Geographic Society and the National Science Foundation. The National Geographic Society took over the operation of this program once it was developed, and it now costs approximately $450 for a class' initial use of one of the units (a six week study). Once begun, the curriculum may be reused for an $80 telecommunications fee.

The FrEd (Free Educational) Mail Network was organized by Al Rogers in San Diego, California. It is managed by many dedicated people who run local bulletin boards and nodes which connect with one another overnight (ensuinglower cost) sending E-mail throughout America. The greatest number of schools in this Network are in California,

although North Carolina has become very active and has set up a node in their state which is available to all their schools. There are other nodes scattered across the country, with even a few at foreign sites, wherever someone is willing to operate a bulletin board. The cost for schools is that of a phone call to the nearest node. There is no general "Network curriculum" since the involved teachers develop their own projects and decide with which schools they will communicate. Such a project is De Orilla a Orilla (From Shore to Shore) in which limited-English and non-English speaking students in New England and California are paired with Spanish-speaking students in Mexico and Puerto Rico for the purpose of improving their writing skills. Another project, Dear Santa, involves young students in grades one through three composing letters to Santa. Their letters are sent to older students in grade five who write replies. The project provides an opportunity for both groups of students to improve their writing skills.

The newest international project of note is the New York State/Moscow School Telecommunications Project which began with twelve schools in each country linked together by electronic mail. The Copen Foundation which is sponsoring the project is being assisted in its development by TERC. The project was just getting started with an introductory unit, titled "Hello",in the spring of 1989. This program also includes an exchange of students, teachers, and administrators to provide support, reinforcement, and further enrichment of the joint projects.

The classroom use of telecommunication in 1989 is at the same stage of use and development as were computers in 1980. There are a few exemplary models, but most teachers are stumbling around trying to find their way. Educators are legitimately concerned that the mistakes made in the early use of computers and educational television not be repeated. Therefore, the following five guiding principles for the use of telecommunications have been established as a result of the research findings of Cohen,

Levin, & Riel with the Intercultural Network and reported by Rogers [1987], and Schrum, Carton, & Phinney [1988] among others:

1. The telecommunications activity must be carrying out a specific curriculum related task.

2. The use of telecommunications must be more effective for the exchange of information than any other means.

3. The participants, students as well as teachers, must get to know each other in order for meaningful communication to take place.

4. The teachers involved must share a strong commitment, both to the lesson to be taught and to the use of telecommunications as the means of sharing data in a timely manner.

5. The teachers involved in the cooperative venture must have a commitment to share the results of the activity with other teachers.

The fact that there is a need for coordinated activities and "not just pen pals" is reiterated over and over by such people as Riel [1987], Rogers [1987], Turkle [1984], and Levin [1989]. Students should not write just pen pal letters; they should write letters as a result of a coordinated activity which presents a specific purpose for writing such letters.

In this Information Age, telecommunications is a part of the world in which we now live. For instance, one can go to a bank automatic teller machine hundreds of miles from a bank; simply insert the bank card; log-on with an identification number, and immediately obtain needed money. This is just one common use of telecommunications today and it requires remembering only which end of the card to put into the machine (with the machine correcting any mistake) and an ID number.

Statement of the Problem

The goal in education should be to integrate telecommunications into the curriculum in such a way that it becomes a tool that is almost as easy to use as the bank card. Turkle first spoke of "transparency versus complexity as a way of experiencing telecommunica-

tions" [Turkle, 1984]. The skills necessary to telecommunicate can be learned transparently while any subject material is transmitted. One of the reasons telecommunications has been slow to be introduced in the schools is that it has not been user-friendly. Rogers [1987] has stated that teachers are not going to be motivated to try telecommunications as long as they have to stumble over the "techno-trivia" [Rogers, 1987] of baud rates, parity, stop bits, etc. Along this same line, Lynne Schrum [1987] has said that we need "front end" software and other aids that will make participation easier so that telecommunication is more transparent to the average user.

Rogers [1987], Scrogan [Feb. 1987], and Lake [1986] have stated that lack of experience with and understanding of the technology by educators within our schools is the reason today's students are not learning to use telecommunications. While in most schools today there are several teachers who are highly skilled in other computer uses, few are really comfortable with telecommunications and the operation of a modem, according to Scrogan [Feb. 1987]. Most teachers have never even seen a modem and don't know the term "baud." Lake [1986] has said that many school computer coordinators have little experience with modems and telecommunications. And superintendents are reluctant to invest in a technology they do not understand.

Statement of Purpose

The purpose of this study was to test an inservice training program for (1) teaching the use of telecommunications to teachers who are relatively inexperienced in the use of computers; and (2) assisting teachers in designing and implementing (a) a telecommunications network linking two local schools, and (b) integrating telecommunications into their curricula. A variation of the intensive training strategy advocated by Joyce and Showers [1983] was used to prepare teachers to use

telecommunications with their students. This training strategy involved cycles of demonstrations, practice, discussion, feedback, and coaching. The research findings of Berman & McLaughlin [1978] and the OTA Report [1988] also support this strategy.

In the fall of 1988, a grant proposal was written by the researcher and submitted to the Nashua School District under the Supplementary Budget for Innovative Projects. The Innovative Telecommunications Project proposed the linking of two of the city's elementary schools through telecommunications. This project would involve the fourth and sixth grades at the Apple Hill and Bartlett Schools (the names of the schools have been changed to provide anonymity of participants). The awarding of this $1500 grant provided both schools with modems, communications software, the installation of phone lines, and payment of the monthly phone bill for the first year. This study is based on the above project.

Teacher Training Model

1. The training sessions were presented by a classroom teacher and not by a consultant.
2. The theory of telecommunications in education was presented in discussions and readings (handouts) so that the trainees were brought to an understanding of the rationale for using telecommunications in education and the principles that govern its use.
3. Each session began with a demonstration of the skill that was to be learned. Additional demonstrations were given as the trainer felt a need on the part of the trainees. The trainees also were able to observe their peers as new skills were practiced and demonstrated.
4. All sessions involved practice and hands-on use of the skills being developed. Practice was also provided between workshop sessions in the form of assignments to be completed.
5. Close support was provided in the form of assistance and peer coaching, and the project trainer was "on-call" and provided coaching during the implementation stage.

Significance of the Study

According to data collected by Quality Education Data (Q.E.D.) in the spring of 1986, six percent of all schools in this country were using modems. Two years later, in the spring of 1988, it had grown to only seven percent [Electronic Education, April, 1986; OTA Report, 1988]. While there seems to be a growing interest in using telecommunications in many school districts, a major inhibiting factor remains the lack of skilled teachers who can implement its use in the classroom. With such a limited classroom use of this new computer tool, the research in this area is sparse. The 1988 OTA Report called for more teacher training in the use of this technology and an increase in research in this area. It stated that the research base in teacher technology education is very weak. Thus, there is need of an empirical study which will document successful training of teachers in the use of telecommunications and their methods of implementation of this innovative technology into their curricula.

Innovation Similarities and Differences

All change has an inherent potential for trauma. While some people welcome change, others resist it. Depending on our personal, knowledge, and experiences, each person perceives and mentally contends with each given issue in a different manner. In this respect the Telecommunications Innovative Project is like all innovations: each individual personally determines whether or not to allow change.

Hall and his associates [1972] found that all people who are in the process of adopting an innovation have definite categories of concerns, and these concerns change in a logical progression as users become increasingly skilled in using the innovation. The Stages of Concern Questionnaire (Appendix B) is an instrument developed by Hall, et. al.

[1972] which measures this developmental movement through seven stages in the process of adopting an innovation. It takes time and successful experience with any innovation for a person to develop the later stage: impact concerns. They do not develop during the first cycle of use. Whether and with what speed higher level concerns develop depends on the person, the innovation, and the environmental context.

The findings of Fullen, Scrogan, and the OTA Report [Chapter II, pp. 36 - 37] indicate that the adoption of computer technology in the school is complex and takes more time and effort than many other curricular innovations. Telecommunications is particularly complex since it:

1. requires collaboration from another site and strong commitment by teachers at each site;

2. is not user-friendly, and the common glitches, which old hands take for granted are very upsetting to new users.

This telecommunications project was different from most other telecommunications training programs because there was close support for the new users with 1) the trainer being available and on-call in the building, and 2) extended coaching, by peers and trainer, provided throughout the initial implementation period. Other teachers who have been trained in the use of telecommunications, either in workshops or college courses, return to their schools and find no technical support during implementation. As a result, telecommunications often cannot be implemented by teachers and they never get to try out their new skills. This was the case at Bartlett School. The trainer had completed a telecommunications course three years before this project was initiated, but he had never used the technology in that time even though he had a modem on a computer at home. It took a month of practice and coaching from this researcher for him to finally feel secure in its use.

Objectives of the Study

The study involves the development and testing of a training curriculum and strategy designed for teachers who wish to use telecommunications as an aid to student learning, but who have had no previous experience either with the technology or its integration into their curriculum.

Four major objectives have been selected:

1. To ascertain the participants' development of knowledge and skills in telecommunications.
2. To measure the development of their concerns and attitudes about telecommunications.
3. To measure the development in the use of telecommunications by the participants at the conclusion of the initial training.
4. To evaluate the use of telecommunications by the students of these trained teachers.

Definition of Terms

Baud A modem's speed, called its baud rate, is a measurement of the relative rate at which it transmits data on a phone line. The two most common baud rates four years ago were 300 baud and 1200 baud, which translate to roughly 30 and 120 characters per second [Lambert, 1985]. For purposes of comparison, text sent to a computer screen at 300 baud will be displayed slowly enough to read as it scrolls past. At 1200 baud, one cannot keep up with it. Today 2400 baud and faster rates are common; however information services such as CompuServe charge a higher fee for on-line use of baud rates above 300.

Bulletin Board System (BBS) This is usually a small-scale, local electronic network that includes a public bulletin board for callers to read and post messages on. Some also provide an electronic mail service and a storage area for data and program files.

Download Downloading is the storage of information on a disk which has been retrieved from another computer via on-line connection. The main reason for downloading information is to print or read it off-line, when you are not paying for connection to the database. Most BBS also have a library of computer programs which can be downloaded, thus providing free programs.

Electronic Messaging: E-mail and Bulletins When information is sent to a host computer and stored there until the receiver calls in to read it, the process is called messaging. Private messages are known as electronic mail or E-mail, while public messages are known as bulletins. People using the BBS have a number which in effect is the number of a private mail box where E-mail can be left. Bulletins usually consist of announcements, requests for information or help, and offers of merchandise for sale.

Information Services Information services are vendors which offer a combination of information and services. CompuServe and The Source are the largest information services in this country. Using one of these services, users are able to make airline reservations, shop for a new car, conduct research using on-line databases, get the latest news and weather reports, attend a conference (several people talking to one-another -- similar to a conference phone call), or leave a message for a friend.

Logging-on Logging-on is the process of calling (dialing a phone number) and entering your password, which connects your computer with the computer you are calling. Logging-off disconnects your computer from the other computer.

Modem A modem is an essential peripheral device which allows a computer to transmit and receive information over phone lines. This device changes digital signals to analog signals, a form that can be transmitted over phone lines, and vice versa. It modulates and demodulates. Modems come in a variety of shapes, sizes, and speeds, as well as prices. Basically, there are two types: internal modems which are inside the computer and out of sight; and external modems which are outside the computer and, therefore, easily moved to other computers.

Network In computer usage, the term Network is applied to three different types of connections. The two types of networks which use phone lines are public and private. There is a third type which does not use phone lines but has its own wiring. This study is not concerned with this last type of network, but it is explained to avoid confusion.

1. The public networks include GTE's Telenet and Tymshare's Tymnet, among others. These computers act as an answering service and switchboard. They are located in most cities and enable you to connect with an information service by means of a local phone call.

2. A private network, on the other hand, has computers that take calls from a select clientele. These callers usually do business directly with the company that has established the network. The National Geographic Society's Kids Network would be an example of this type of network.

3. Local Area Networks (LANs) are usually a group of computers within the same building which are connected through the building's wiring, and the distances between computers is much shorter than networks using telephone lines.

Real Time The communication between two (or more) people that occurs while both are online.

Telecommunications In the realm of computers, telecommunications refers to the electronic exchange of information between distant computers.

Upload Uploading is the opposite of downloading--you are sending a file which is stored on your disk to a remote computer. Uploading also reduces on-line connect charges: You can write your message off-line, store it on a disk, go on-line, and then upload the file faster than you could type it while paying a connect charge.

Videotext The generic term for receiving and sending textual information on a video screen.

CHAPTER II

REVIEW OF LITERATURE

The literature relevant to the study of telecommunications experiences as they are integrated in the curriculum of the elementary classroom is organized around the following topics: education in the information age (a philosophical background), computers in education, communication (writing and telecommunication), and teacher training.

Education in the Information Age

Seymour Papert has said that schools, as we know them today, will have no place in the future [Papert, 1980, p. 9]. He envisions a learning environment outside the classroom where children will learn, via computer, much if not all the knowledge schools presently try to teach. His model of successful learning is a child learning to talk, a process that takes place without deliberate and organized teaching. Following this theory, the Logo computer language, which Papert helped to develop, has been introduced to children using a discovery methodology.

Many educators, among them Estes [1978], Wagschal [1984], Snyder & Palmer [1986], and Melmed and Burnham [1988], are concerned with the performance of our schools today in terms of their failure to keep pace with the rapid social and economic changes that are taking place in the world. The traditional classroom instruction found in most schools is irrelevant to our students of today [Snyder & Palmer, 1986].

Research has shown that 90% of all teachers use textbooks 95% of the time for teaching [Holdzkom & Lutz, 1985]. The student is expected to memorize information for

complete recall on a test. Estes [1978] claims that, in our schools today, the student is focused backward instead of forward.

> With our present emphasis, a student would logically conclude that he needs to know a lot about what happened hundreds of years ago, a little about what is happening now, and nothing about the future [Estes, 1978, p. 4].

As Melmed and Burnham [1988] have pointed out, the students of today are a new breed--culturally heterogeneous, less docile and obedient, influenced by a pervasive presence of television. They bring new conditions that challenge the concept of school isolated from the realities of social and economic life.

A New Direction

In a society where the amount of available information is increasing so rapidly that it is impossible to keep abreast of it all, it has become necessary to change the focus of education from one of "learning facts" to that of learning how to learn. If students are to be equipped to live in this increasingly complex world, they must be taught how to locate and deal with this information, rather than being required to memorize bits and pieces of it. Adler & Van Doren writing in The Paideia Program have said that:

> Well formed habits of skilled performance are more desirable than the verbal memories produced by didactic instruction--the kind that enable students to pass examinations in various subject matters [Adler, 1984, p. 9].

And the U.S. Office of Technology Assessment states that:

> The so-called information revolution, driven by rapid advances with communication and computer technology, is profoundly affecting American education. It is changing the nature of what needs to be learned, who needs to learn it, who will provide it, and how it will be provided and paid for [Office of Technology Assessment, 1982].

The focus of education in the information age is turning to a greater emphasis on the higher level processes and cognitive skills (e.g., ability to identify and solve problems, inquiry skills, analytic thinking). However, the findings of Yager [1983] and Goodlad [1983] indicate that students do not acquire any of the abilities of "intellectual development" [Holdzkom & Lutz, 1985]. It appears that while we are aware of the changes taking place in society, and the need for a revamping our educational process to meet these changes, it is not yet happening in the classrooms.

We are told that students in the information age need to learn how to learn as they embark on a lifetime of learning. Psychologist Herbert Gerjuoy of the Human Resources Research Organization has said:

> Tomorrow's illiterate will not be the man who cannot read; he will be the man who has not learned how to learn [Estes, 1978, p. 10].

The National Science Board Commission on Precollege Education in Mathematics has said that the 21st century requires "new basics", and these "must include communication and higher problem solving skills, as well as scientific and technological literacy--the thinking tools that will allow our children to understand the technological world around us." [Holdzkom & Lutz, 1985 p. 8] As Papert [1980] has stated, this is not just a difference of a small and technical choice between two teaching strategies, but rather it is a difference in fundamental educational philosophies.

Computers in Education

"Computers can be carriers of powerful ideas and of the seeds of cultural change."
--Papert

We are at a point in the history of education when radical change is possible, and many educators, including Papert [1980], Snyder [1986], and Toffler [1980], tie the possibility for that change directly to the impact of the computer. Papert [1980] believes that the computer might have more fundamental effects on intellectual development than did either television or even printing.

However, there is ambivalence in the air and Turkle has said:

> It is an understatement to say that people are ambivalent about the growing computer presence: we like new conveniences [automated bank tellers, faster supermarket lines], but on the eve of a new era we, by definition, do not know where we are [Turkle, 1984, p 65].

The rapid changes have been disquieting for adults, while children take the new technology for granted. Turkle [1984] points out that, for the children, this computer presence is a fact of life and not a new technology. The exciting fact remains that an emerging creative approach utilizing computers might well modify and improve education establishing computers as an accepted component of a powerful learning environment.

Teachers

> "It has even been suggested that the real revolution is in teaching, and that the teachers are changing more than the kids." -- Snyder

As computers first began moving into schools, the need for preparation and teacher training was largely overlooked. One day THE COMPUTER arrived and teachers did not know what to do with it. This resulted in many computer-phobic teachers. Since then, many people, from then Governor Sununu of New Hampshire--who established the state wide Computers for Teachers Initiative in New Hampshire--to educators, including Snyder [1986] and Wagschal [1984], have stated that the key to the effective use of computers in education is to place the machines in the hands of teachers. Tom Snyder believes that the focus of change and integration will be teachers who can combine their pedagogical wisdom with a growing knowledge of and skill with computer technology [Snyder, 1986].

In New Hampshire, 2,200 teachers were given an Apple computer to take home for their personal use for three years. They were provided with training and software. This was to provide each teacher the opportunity for adequate hands-on experience with the computer and give them a practical understanding of the potential of this new technology. It was felt that only a teacher who was comfortable with the computer could make wise use of it in the classroom.

According to Wagshal, one of the guiding principles when considering how to incorporate computers into the schools is that:

> the decisions must be made by individual teachers, because they are the only ones who can sensibly and realistically determine how best to use this new technology to help their students learn [Wagschal, 1984, p. 253].

To make such decisions, however, teachers must have sufficient hands-on experience with computers to give them a practical understanding of the potential uses of this new technology.

Change comes slowly in public education. While most teachers are ambivalent and a few still computer-phobic, each school usually has at least one teacher who knows the benefits of the computer. They are the ones who discovered exciting new ways to teach and to learn with this powerful new tool. They are the teachers we must emulate if we wish to have a voice in the future development of computer use in schools.

> The educational computer revolution takes significant cultural change, a nation getting accustomed to the technology, familiar with its strengths and its weaknesses, and teachers willing and able to make something of it [Snyder, 1986, p. 21].

Curriculum

"Real teachers don't like CAI." -- Snyder

In this age of accountability, where educational activities are evaluated in terms of their quantifiable results, we do not want to hear about the unknowable, the untestable [Snyder, 1986]. For teachers who are just beginning to get acquainted with computers and what they are all about, CAI, or computer-aided instruction, is easily understood and most closely parallels what is thought of as traditional teaching methods. It includes drill-and-practice software and tutorials. Drill-and-practice programs use the computer as a glorified set of flash cards to review material already learned, with the intent of reinforcing the learning. It fits the existing curriculum and is the easiest to design to interface with textbooks. With CAI, quantifiable results can be produced and it can be shown that the children have improved in skills and knowledge and that they have learned.

CAI is the most common application format for educational software and the most disappointing. It is disparaged with good reason by many educators [Snyder, 1986; Naiman, 1987; Olds, 1984] for it reflects a limiting pedagogy, the dullest of teaching

methods, and fails to exploit the tremendous power of the medium and the creative role of the teacher. "It's like taking a helicopter to the grocery store" [Snyder, 1986, p 60]. Most computer educators agree that this is not the way to go if we want to make something of computers in education.

> Learning is inherently interactive, beginning with a question, moving to an exploration, and then onto an expression of what has been learned. ...Second guessing is what one learns to do with CAI, not intuitive cognitive leaping, not cooperative learning [Snyder, 1986, p. 85].

Turkle [1984] points out that it is important to recognize that the primary use of computers in the schools is not intervention but rather it is to liberate and elaborate. Computers should be used in classrooms to enhance already-excellent methods. Both Snyder [1985] and Daughtery [1985] have stated that it does not make any sense for a good teacher to modify the classroom or change the curriculum to fit the computer.

> In essence, appropriate computer usage should be viewed as a methodological hybrid, seen as an important media only when and where it offers significant instructional experiences" [Daughtery, 1985, p 7].

Snyder [1986] calls for a period of fifteen to twenty years to explore and experiment with this technology without being prematurely committed to any stock format for the use of computers in the schools. In September 1988, the Office of Technology Assessment report, Power On! New Tools for Teaching and Learning, also recommended that the focus of federal programs should not be the single best use of technology in the schools, but rather encouragement toward a variety of uses in different districts. Snyder [1986] also supports this view and argues that we need to "mess around" with educational computing without agenda or deadlines. Too often, rigidly defined curriculum goals and a prescription for achieving them allow little room for creative endeavor.

> It is important to realize that many current applications of microcomputers are answers to OLD problems. The potential of microcomputers to solve problems of which we are only vaguely aware or to extend our capabilities in new ways is great [Holdzkom & Lutz, 1985, p. 117].

Communication

"Stimulating students' development of communicative competence should be a goal of teaching." -- L. C. Wilkinson

Computers may offer new opportunities for learning which are not available in noncomputer classrooms by providing tools that facilitate writing and by creating communication environments which encourage writing.

Writing

Picture a classroom teacher holding yellow lined paper up in front of a group of young children as the school year begins, assigning the task of describing recent summer experiences, and one has the stereotype image chided by critics everywhere. However, writing and its instruction can be difficult tasks.

In the past, the composing process and the communicative function of writing were often overlooked by educational researchers who focused instead on the produced product. They used the writings as artifacts from which to draw inferences about the writers' cognitive abilities and the adequacy of writing instruction [Moffett, 1968, in Florio, S. & Clark, C. M., 1982]. Instruction was, for the most part, drill and correction of the surface features of grammar. Too often, children in school settings became overwhelmed with the mechanics of handwriting, conventional spelling, grammar, order and the formal content of

their writing. As Kumpf [1985] points out, these obstacles can be compounded when the student lacks a purpose for writing.

Recently, "interest has grown among researchers from many disciplines in the process of writing as functional communication and in the social contexts in which writing is undertaken (e.g., Basso, 1974; Goddy, 1968]" [Florio & Clark, 1982, p. 266]. Writing teachers are faced with the problem of providing meaningful contexts for writing and getting children enthusiastically involved in writing.

> To address these concerns the school curriculum needs to be organized around situations that children find interesting, important, and worth sharing with others. A classroom context shaped in this manner would center on meaningful situations that provide children with a purpose and use for writing [Kumpf, 1985, p 22].

Children find the rewriting of text to be so laborious that he first draft is usually the final copy, and they never acquire the skill of editing. This can be changed by providing a word processor which facilitates revision and alleviates the child's concern for getting his or her writing letter-perfect the first time around. With the use of a word processor, children are encouraged to become more like expert writers and regard their text as a work constantly in progress and readily revised.

Research of the effect of a word processor on children's writing, while yet in its preliminary stages, shows that children do write MORE when using a word processor than they do with pencil and paper [Levin, Boruta, & Vasconcellos, 1983; Daiute & Taylor, 1981; in Wilkinson, A.C., 1983]. Papert [1980] has seen children

> move from total rejection of writing to an intense involvement (accompanied by rapid improvement of quality) within a few weeks of beginning to write with a computer [Papert, 1980, p 30].

The positive effects of using a computer for writing also extend to the finished product and the printing out of that writing. For many children, especially those having difficulties with penmanship, being able to produce an attractive finished product with a printer is an exciting possibility because it encourages them to view their writing with pride.

Levin, Boruta, & Vasconcellos [1983] focused their research on the role that external resources play in writing and in the acquisition of writing expertise. Using a telecommunications system, children in San Diego sent and received electronic messages from children in Alaska.

> This exchange of messages gives us yet another way to bring social resources to the educational setting, broadening the range of peers available for children to draw upon for learning and problem solving [Levin, et al., in Wilkinson, A.C., 1983, p. 220].

Telecommunications

> The quest to provide a global education is emerging on Earth in classrooms around the world. It is emerging because of a new technology which allows education to transcend national boundaries and dispel international ignorance. It is emerging because of telecommunications. Telecommunications is revealing itself as the "pencil" for the 21st Century. It will give us a profound new learning environment called "The Global Classroom" [Itzkan, 1988].

Although telecommunications is a standard tool in everyday use in the business world, our educational system lags far behind in adopting this technology as an educational tool. Recent surveys indicate that only seven percent of our nation's schools have the capacity to go "on-line," and only four percent of the elementary schools are able to do so [OTA Report, 1988, Quality Education Data in Electronic Education, April, 1986]. As stated earlier, the key to this emerging technology being adopted in the schools lies with the

teachers and school administrators. They need to be informed and educated in its use and the potential it has in the schools' curriculum.

Secondly, telecommunications in the classroom has often been a theoretical, impractical, difficult, expensive, or irrelevant activity, often done as a "computer literacy" activity [Rogers, 1987, p. 2]. Telecommunications can be an effective tool for students when it is used appropriately and integrated into the curriculum. In an effort to overcome some of the problems noted above, Rogers has established CMS [Computer Mail System] School-Net as a low-cost Apple-based Bulletin Board System which handles the transmission of E-mail across the country.

Telecommunications is a form of social interaction and it requires someone on the other end with whom you want to communicate--someone you know. Both Rogers [1987] and Riel [1987] have stressed the importance of developing a social structure, encouraging students to establish meaningful relationships, if telecommunications is to be really successful. This collaborative interaction creates a more complex experience. "A social isolate can be successful with a word processor, database, or spreadsheet program, but in a communications experience via modem, you must be part of a social structure" [Rogers, 1987]. Failure to develop this bond between participants results in a shallow and diminishing flow of communication.

Why use telecommunications in the elementary school?

1. Teachers are aware that in process writing, young students need an audience for their work. Through the technology of telecommunications, that audience can be expanded beyond the four walls of the classroom. As a result, the writing becomes more meaningful to the student. Electronic letter writing may very well be a classroom experience that helps students discover a purpose for writing [Kumpf, 1986, p 27]. Communication between

schools on the local level -- across the city -- can be just as meaningful for this goal as those across the country or around the world.

2. Telecommunications can now break down barriers of time, culture, and personality, which tremendously enhances its educational potential and value. In the global classroom, students and teachers from around the world join in teams and learn together, connected from classroom to classroom via international computer networks. Students learn about states and countries from their peers in those places.

Dr. Alvin Coleman, Superintendent of schools in Pottsgrove, N.J., following a year of telecommunication between one of his schools and a school in Australia [Australian-American Connection], said:

> We are delighted that the kids had the opportunity, not from a technology point of view, but for the opportunity for global understanding and meaning at a child's level. This , student-to-student experience will groom better adults and world citizens for tomorrow on both sides of the Pacific [Butler & Jobe, 1987, p. 26].

Even a teacher from New York City who described her students as being provincial in their outlook was able to open up the world for them through a pen-pal program with a school in Canada. Through their letters, the students were learning what the Canadians think of the United States.

3. Electronic message systems have tremendous implications for education in remote isolated areas. They open up a wider range of resources to previously limited educational settings.

4. Telecommunications encourages the use of computers as tools--"a tool for developing higher-level thinking skills which can foster such uniquely human abilities as goal setting, communicating with others, and analyzing and evaluating situations" [Carney,

1986, p. 14]. Through the acquisition of telecommunication skills and experiences, elementary school students are building a foundation in the use of this cultural tool which will enhance their future learning and development.

> Trying to determine the educational potential of computer networks is a bit like trying to assess the educational value of a film projector: Unless you know something about what is to be projected and the educational context that will be created around it, the project is not useful. Educators need to look past network as the goal in itself and ask the more serious question of how activities that include the interaction of participants in other locations help students and teachers achieve important educational goals.
>
> The teacher ...needs to take an active role in designing educational experiences that take advantage of network potentials. Simply asking students to write to one another is an extremely limited use of a new powerful educational tool. Networks should be used to create new forms of cooperative learning that involve students in meaningful group tasks [Riel, 1987, p. 30].

Inservice Training

The need for comprehensive inservice training of teachers in the instructional uses of computers remains a challenge today in most school districts. The tip of the iceberg is all that has been met so far in the training of teachers in the use of this new technology. The 1988 OTA [U.S. Office of Technology Assessment] Report had an entire chapter on the role of teachers and the need for increased teacher training. The great potential of computers as teaching and learning devices cannot be realized until teachers and administrators are computer literate.

It has been the hope that new teachers just entering the field will have received this training in college. However, the OTA Report found that of 142,000 new teachers expected to graduate in 1988, almost all had some instruction in the use of computers, but

most (70%) "do not feel prepared to use computers in teaching" [U.S. Congress, OTA report, 1988, p. 100].

The point has been made by Moursund (1989) that participants of computer inservice programs may develop greater computer knowledge, skills, and positive attitudes toward computers but it does not follow that they will, necessarily, increase their classroom use of computers. He states that inservice training can be quite effective in increasing a teacher's knowledge and skills in this field and yet have little impact on the teacher's students [Moursund, 1989]. There are several variables that may account for this failure to implement the technology in the classroom, such as constraints on time and budgets. Sutphin points out that sociological/psychological adjustment of the learner is important in developing competence in computer use. He further states that:

> Fear and apprehension about using technology could be a functionally limiting variable to impede both learning of technology and implementation of technology, even if appropriate skills are learned [Sutphin, 1987].

While it has been found [OTA Report, 1988] that most teachers want to learn to use the new technology, adopting it is complex and takes more time and effort than many other curricular innovations. Scrogan [1989] has stated that computer technology makes teaching more challenging before it makes it easier. And the research of Fullan concludes that : "we have vastly underestimated how difficult it is for teachers to implement the changes such new technologies actually require in practice" [Collis, 1989, p. 6].

Sutphin argues for:

> well-conceived theoretical or research-based teacher training models and implementation strategies for educating teachers on the instructional applications of microcomputers [Sutphin, 1987, p. 54].

The research indicates that successful inservice training programs make use of the following strategies:

1. Teachers or those with close ties to the classroom, rather than consultants, make the best presenters for training sessions [Berman & McLaughlin, 1978; OTA Report, 1988].

2. Theory of the skill should be explored through lectures, discussions or readings (handouts) so that the trainee is brought to an understanding of the principles that govern its use [Joyce & Showers, 1983, 1988; Stechner & Solarzamo in OTA Report, 1988].

3. Demonstration or modeling of the skill is necessary [Stechner & Solarzamo in OTA Report, 1988; Joyce & Showers, 1983, 1988]. According to Joyce & Showers, trainees learning a new teaching strategy need fifteen to twenty demonstrations throughout a training sequence.

4. Practice and hands-on sessions are the only way to develop a skill [Joyce & Showers, 1983, 1988; Stechner & Solarzamo in OTA Report, 1988]. Again, Joyce & Showers recommend a dozen or more opportunities to practice the skill. Stechner & Solarzamo call for peer interaction in the form of communication among participants during the hands-on sessions as being particularly effective.

5. Close support in the form of classroom assistance or follow-up, with peer coaching or project/district staff "on-call", is necessary to carry a new skill into the implementation stage [Berman & McLaughlin, 1978; Joyce & Showers, 1983, 1988; OTA Report, 1988].

It appears that the last strategy is one which is often missing, and this may account, in part, for teachers not implementing their new skills and knowledge in the classroom. In the case of telecommunications, there are many teachers who have been trained in the use of this technology but have not gone on to use it. Telecommunications is more complex than most of the ways in which computers are used in the classroom, and even the more advanced computer-using educators are often intimidated by it. Therefore, support and coaching may be very critical to this particular innovation.

Berman and McLaughlin [1978] found that the number of years of teaching had negative effects on the outcome of innovative projects.

> The longer a teacher had taught, the less likely was the (innovative) project to achieve its goals [Berman, et al., 1978, p. 32].

On the other hand Hall's, et al., [1979] research found no relationships between demographic variables and concerns data. Rather, they found:

> Increasing support for the hypothesis that "interventions" and "conditions" associated with the implementation effort are more critical variables than age, sex, teaching experience, etc [Hall, et al., 1979, p. 52].

Moursund (1989), writing on the evaluation of computer inservice, states that the majority of computer related inservice programs are not evaluated. For evaluating a computer related inservice, he sets forth the following guidelines:

1. Measure the extent that inservice objectives were achieved,
2. Identify problems associated with implementing the inservice objectives in the classroom.
3. Measure the long term effect of inservice objectives on student achievement.

Conclusions

As education moves into the twenty-first century, we need to move out of what Freire [1982] calls the "banking" concept of education, where facts are deposited, and instead provide our students with tools for learning. We have the ability to revamp and revitalize our educational system to meet the social and economic needs of today's students, and the computer is a tool that can do this.

Telecommunications is a powerful tool which is not being used in our schools as much as it is in the business world. Businesses are growing as a result of their use of telecommunications and our schools have the opportunity to expand their educational offerings and opportunities to students through the use of this same technology. While it is clear that students are not learning to use telecommunications in the classroom, they will not do so until educators become adept in its use. Thus, it behooves us to provide the teacher training which will bring our educational system in line with the business world, as well as moving it into the next century.

The further exploration of an inservice training model which supports the implementation of telecommunications in the classroom may provide new insights into preparing our teachers to use this innovation. The pursuit of this research provides not only the hope of an immediately usable inservice training model, but also a model for implementing telecommunications in the elementary school.

CHAPTER III

RESEARCH DESIGN

This study examined the context of innovation in a telecommunications project between two schools, Apple Hill School and Bartlett School (not their true names), in a small city in New England. It looked at the effectiveness of an inservice training program (1) teaching the use of telecommunications to teachers who are relatively inexperienced in the use of computers; and (2) assisting teachers in designing and implementing (a) a telecommunications network linking two local schools, and (b) integrating telecommunications into their curricula. A key purpose of the study was to develop an inservice training program in telecommunications which can serve as a guide to local school districts planning to implement this technology. The exploratory and descriptive nature of the study suggested a qualitative, case study methodology.

This chapter will present a schedule of the study and apportioned time spent within each phase. A discussion of the study's phases will be addressed in the following order: 1) design of the study and articulation of the research questions; 2) procedures; 3) instrumentation and data collection; and 4) data analysis. Figure 1 illustrates in graphic form the time line of the study, as well as overlapping of the research phases.

Time Line of Research Phases

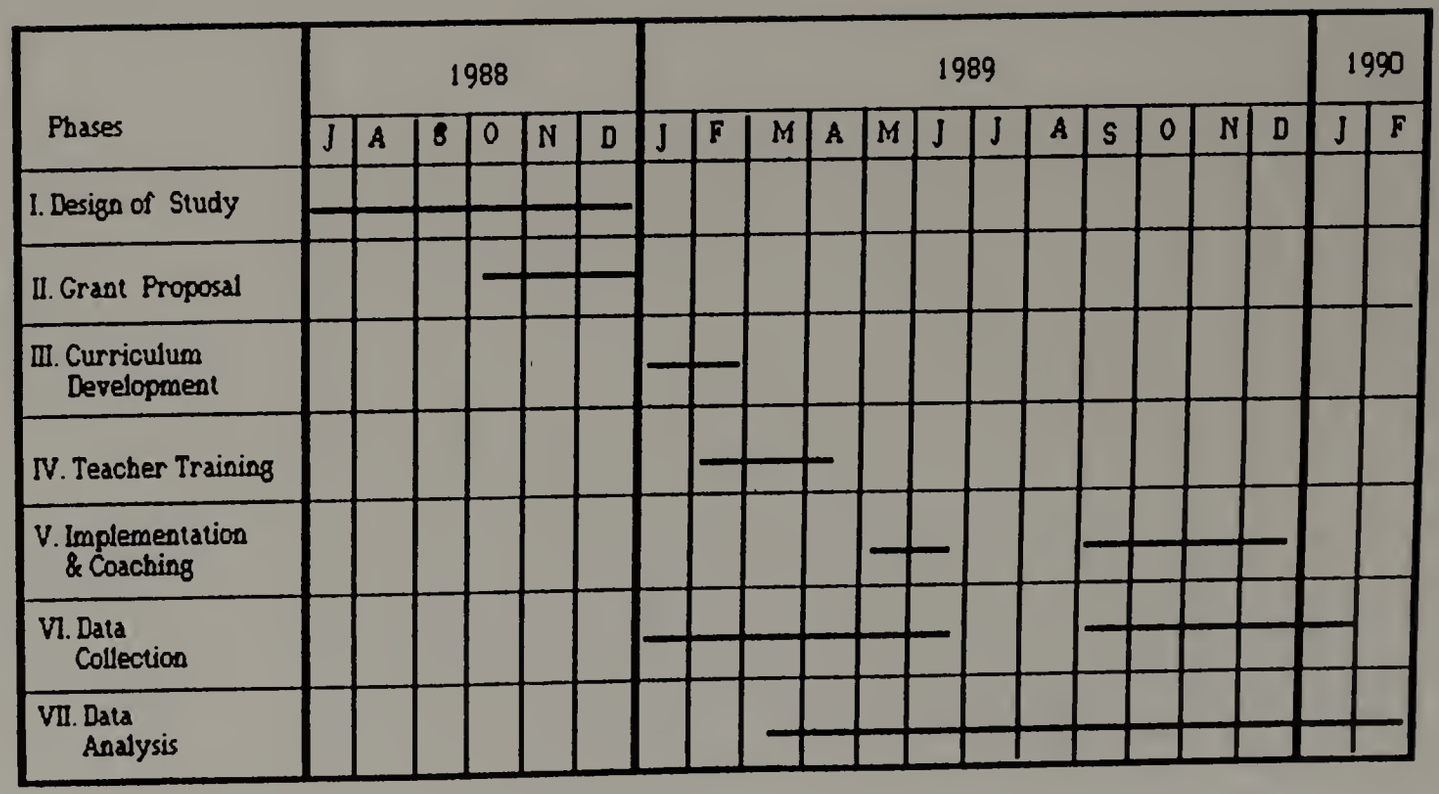


Figure 1. Matrix Time Line of Research Phases

Time Line of the Research

The researcher was actively involved with this study for a period of one year, six months. The phases of the study which entailed the major portion of time spent were: 1) collecting data and 2) transcribing, analyzing, and preparing a final report of the data.

Design of the Study and Articulation of the Research Questions

The study stems from the researcher's background, knowledge, and experiences related to the use of telecommunications in the elementary classroom and the training of teachers in the use of computers. The research questions evolved from a series of questions, concerns, recurring themes, and the literature. Several questions were investigated:

1. Did the teachers develop knowledge of and skill in the use of telecommunications as a result of the training?
2. Has there been a change in the teachers' concerns and attitudes toward telecommunications that can be attributed to the training?
3. Did the teachers' instructional and professional use of computers change as a result of the training?
4. Has there been a change in the instructional use of computers by the students of the inservice teachers that can be attributed to the training?

The formal research study design was a multi-site, multi-method study [Patton, 1980] in which the researcher, through participant observation, shared the life and activities of the program under study, thus developing an insider's view of events. Triangulation of the data was achieved through use of:

* background and demographic questionnaires,
* an inservice evaluation questionnaire,
* on-line data collection,

* teachers' logs of on-line use,

* the Levels of Use Chart (Appendix B) [Hall, Loucks, Rutherford, and Newlove, 1976] to assess observations and teacher interviews,

* feedback from teachers, and

* the Stages of Concern Questionnaire developed by Hall, George, & Rutherford at the University of Texas [1979].

Sample

Three elementary teachers (grades four and six) from a small city school district in southern New Hampshire were invited to participate in the study on a voluntary basis. They were located at the Apple Hill School where the researcher conducted the training program. The three volunteers varied in skills and background experiences with the computer but all of them could be considered relatively inexperienced. The data collected was used to explore inservice training and describe patterns of use in implementing telecommunications in the curriculum.

These teachers were a part of a larger group of nine elementary teachers (grades four and six) in the school district who were to participate in the inter-city telecommunications project which was being initiated. The six other teachers were located at the Bartlett School and were linked with the teachers in the target group by telecommunication. All of the teachers had previously volunteered to participate in the innovative telecommunications project at the time that the grant proposal was written. District approval was received to approach nine teachers to participate in this research study (Appendix C).

Prospective participants were provided with an outline of the program description and a list of requirements for participation (Appendix C). The requirements included attending skills development workshops and participation in implementation of telecom-

munications related activities in their classrooms for a minimum of four weeks after the completion of skills development. The classroom telecommunications activities were developed by the participating teachers.

The nine elementary teachers who agreed to participate in the study had prior experience with computers which ranged from very little to a maximum of a graduate degree in computer applications (the latter being the lead teacher at the Bartlett School). The six teachers at the Bartlett School had been a part of the Governor's Initiative Program, "Apples for the Teacher," which had provided each of them with a computer for use at home. Those teachers had attended computer workshops in tool applications, i.e., Appleworks and Grade Manager, and were therefore more advanced in their use of computers than the target group.

These teachers were a professionally very stable group, having taught an average of 11.9 years at the same school and an average of eight years in their present assignment. The demographic characteristics of the teachers are summarized in Table 1. Seven of the nine teachers held a Masters degree with three of the seven having an additional thirty hours beyond the Masters degree, including the completion by one of a program in computer applications.

TABLE 1. Demographic Characteristics of Teacher Sample

Dimension	Category	Frequency	Total
School Type	Elementary School	9	
			9
Grade Levels Taught	Grade 4	4	
	Grade 6	5	
			9
Teaching Responsibilities	Most subjects	6	
	Reading, Spelling, Language, Science	1	
	Math, Spelling, Language, Science	1	
	Social Studies, Spelling, Language, Science	1	
			9
Years of teaching	2 to 4 yrs	0	
	5 to 8 yrs	0	
	9 to 13 yrs	2	
	14 to17 yrs	2	
	18.+ yrs	5	
			9
Highest Degrees Completed	BA/BS	2	
	MA/MS or M Ed	5	
	MA+30	1	
	CAGS	1	
			9

Establishment of the Researcher's Roles and Relationships

The researcher, who serves as a building computer coordinator, wrote the proposal for a special district grant which would provide funds allowing two elementary schools to establish a telecommunications program. This grant funding paid for the installation of a phone line, a modem, telecommunications software, and the monthly cost of the phone

lines in the two schools. Arrangements were made to use the Bulletin Board of the local Apple users group, Southern New Hampshire Apple Core.

The researcher developed a teacher training program which would introduce the teachers who were to be a part of this study to telecommunications and to develop their skills as users of this technology. Activities and print materials were designed which provided a series of four one and a half hour workshops on telecommunications, with assigned on-line practice sessions between workshop sessions (Appendix A). To complete this program, a teacher would spend ten to fourteen hours learning telecommunications skills.

The researcher provided the training necessary for the teachers to develop telecommunications skills. This included a refresher course on Appleworks for two of the teachers and an introduction to Appleworks for another. This phase of the training was provided early in February 1989, prior to the commencement of the telecommunications training program. An important part of the telecommunications training, both during the initial workshop period (especially during individual practice sessions) and during the following implementation period, was that of "coaching" (Showers, 1982). As trainer, this researcher was "on call" to assist and coach the participants in the on-line use of telecommunications.

The researcher observed the telecommunications environment, room arrangement, teachers' activities on the computers, and teachers' spontaneous behavior during transmission of electronic mail. Further data was collected from telecommunication transmissions, interviews of the teachers, the teachers' evaluations of the inservice training, and the Stage of Concerns Questionnaire (Hall, George, & Rutherford, 1979).

Procedures

Procedures for the study were centered around three distinct phases: 1) development of initial skills in the use of telecommunications, 2) follow-up training for classroom implementation by the teachers, and 3) assessment of student use of computers and telecommunications.

Phase 1 - Development of Initial Skills with Telecommunications

The initial skills development program included a four week inservice workshop which met once a week, with assigned telecommunications practice between meetings. The emphasis during this phase was teacher acquisition of telecommunication skills. Telecommunications objectives included being familiar with technical terms, equipment, the use of a local Bulletin Board System (BBS), as well as direct connection of two remote computers, preparation of text files for uploading to a BBS, and the downloading of E-mail from a BBS. Key teaching issues concerned how teachers could best integrate telecommunications into their curriculum and help students to expand their communication beyond the classroom. Phase 1 instruction time totalled nine and a half hours, including four hours in on-line practice of telecommunications. Training materials used in Phase 1 appear in Appendix A. During Phase 1 the teachers kept logs of their on-line practice time (Appendix B).

Workshop Session One

Initially, an overview of the use of telecommunications in education was presented and discussed, with information services, networks, local BBS, and remote-to-remote connections being considered. The technical terms and vocabulary of telecommunications

were explained. The software and hardware that would be used were discussed and the procedure of connecting the computer to a modem and phone line was demonstrated.

The instructor then gave a demonstration beginning with dialing the BBS from the Main Menu of the software, signing on as a new user, obtaining a user number and password for class use, and then logging off the BBS. Participants proceeded to follow what had been demonstrated; logging-on to the BBS and obtaining a user number and password for her class. The participants were also provided with a guide, "Logging-On to BBS" (Appendix A), which took them step by step through this process. This guide, prepared by the instructor, was intended to support the learning process in the succeeding weeks. Since there were many questions regarding who would use a bulletin board and for what purpose, we took a quick look at some of the bulletins on the board and discussed their various purposes.

The participants were instructed that during the next week they should write a message to the instructor using Appleworks and save it on a data disk which they were to bring to the next workshop session.

Workshop Session Two

This session focused on creating text (ASCII) files using the Appleworks program and uploading them to the BBS. Each participant had prepared a message using the Appleworks word processing program with which they were familiar, and this had been saved as a word processing file on their disk. The session started with each participant at a computer using Appleworks and getting the word processing file to show up on the screen. They then moved through the steps of printing this file as a text (ASCII) file on their data disk. A printed guide, "Preparing Files to E-mail" (Appendix A), was also provided by the instructor for future reference.

The instructor then demonstrated the process of logging-on to the BBS and uploading a text file from a data disk. Following the demonstration, each participant, used a copy of Access II (the communications software):

* to start up the program;
* to open a new recording file;
* to log-on to the BBS;
* to read the mail they had waiting (from instructors, Appendix A);
* to upload a file from data disk to BBS; and
* to log-off the BBS.

Each participant had the hands-on experience of uploading E-mail and also the opportunity to watch the process several times as their colleagues followed the outlined procedure.

During this second part of the workshop two handouts, "Recording File" and "Uploading Mail" (Appendix A), were provided by the instructor and used as guides by the participants as they moved through this process. These guides were to provide support in the learning process as participants continued to practice between workshop sessions.

The participants were instructed to log-on to the BBS during the next week (and before the next workshop session) and send E-mail to other teachers on the system. Arrangements were made for the instructor to be available as a coach to assist as needed when the participants were practicing their new skills.

Workshop Session Three

The focus of this session was on the downloading of text files from the BBS and then accessing the text files from within the Appleworks program. During the preceding week, all participants had logged-on to the BBS and sent E-mail to their colleagues. This

was done during individual practice sessions following the last workshop. The instructor had also sent an informational article on the use of telecom-munications (Appendix A) to each of the participants through E-mail. A demonstration consisting of logging-on to the BBS and recording the E-mail onto a data disk was presented by the instructor. The participants were given a step-by-step guide, "Down-loading E-mail," (Appendix A) to assist them in learning this process. Each of the participants was then given the opportunity to practice these procedures. Using their individual copies of Access II, each participant:

* started up the Access II program;
* opened a new recording file;
* on the recording feature of Access II;
* read the E-mail they had waiting (from colleagues and instructors);
* logged-off of the BBS; and
* turned off the recording feature of Access II (causing E-mail to be put in disk recording file).

Then, with each participant at a computer, they moved into the Appleworks program. They learned how to take an ASCII text file and change it to a word processing file. A guide in the form of a handout titled "ASCII to Appleworks" (Appendix A) was provided by the instructor. The participants:

* started up the Appleworks program;
* brought the ASCII text file up on the desk top, making it a new Appleworks word processing file; and
* cleaned up the file (deleted any transmission data) and put in formatting for the end of pages.

The participants were instructed to log-on to the BBS before the next workshop session, to practice uploading and downloading E-mail. They were to send E-mail to their

colleagues and to the instructor. The E-mail which they downloaded was to be printed out and brought to the next session.

Workshop Session Four

The fourth session in this series of workshops dealt with the direct connection of two remote computers without the use of a BBS. The session began with the instructor demonstrating how to set up the communications software to communi-cate directly over the phone line with another computer. As in other sessions, a handout guide, "Terminal Characteristics," (Appendix A) was provided which shows the software settings that are being used both for communicating with the BBS and remote-to-remote.

The instructors at each of the two schools had made plans regarding which computer would place the call and which would be set to receive the initial call for this workshop. The instructor provided a guide for future reference, "Remote to Remote," (Appendix A) giving the procedures both for placing a call and receiving a call and the modem commands for each of these.

The participants had the opportunity to chat and get acquainted. This personal acquaintance is considered an important criterion for the success of telecommunication activities, as discussed in both Chapter I and Chapter II of this study. Two of the teachers from Bartlett were not present. Part of the agenda for this on-line workshop was to select a date for the next workshop when the teachers from both schools were to come together for the first time to meet and plan class telecommunication activities for the remainder of the school year.

In the meantime, teachers were planning to continue using the BBS to practice sending and receiving mail. No plans were made to practice remote to remote connections.

Phase 2 - Transfer of Training

During the ten weeks following the development of initial skills with telecommunications, two coaching procedures were employed to facilitate transfer of training.

A follow-up training, termed "coaching" [Showers, 1982], involved frequent observation and feedback sessions held in the computer lab on a one-to-one basis with each teacher and the researcher/trainer. These sessions focused on the teacher's experiences with telecommunications. This frequent informal contact was designed to provide support and technical assistance as the teachers were implementing telecommunications in their classrooms. In the spring of 1989, this implementation was limited to classes getting acquainted with each other and the technology. Letters introducing themselves were written by each class, and a progressive story was written by having several classes add new paragraphs to a story.

During the first ten weeks of Phase 2, the researcher/trainer was available and on-call in the building whenever the teachers had questions or problems. Coaching sessions in the computer lab were scheduled during the day when the teachers had free periods (if the lab was not in use) and after school. The frequency of these sessions was determined to a large extent by the individual teacher, with the less experienced computer users requiring more assistance. The coaching sessions ranged from five to twelve per teacher with the researcher/trainer, averaging two sessions per week. These sessions were usually about an hour in length.

The teachers also worked together in pairs, which provided companionship and additional technical assistance during their process of implementing this innovation. Besides providing peer support for those having problems during implementation, it also

created opportunities for participants to communicate about the use of such innovation in their teaching, recognizing additional possibilities for its use.

At the completion of Phase 2, all participants were interviewed to provide triangulation of data in determining their level of use of this innovation (Appendix B: Levels of Use Interview). They also completed a questionnaire (Appendix B: Stages of Concern Questionnaire) designed to assess their perceptions and concerns with the innovation.

Phase 3 - Assessment of Student Use of Telecommunications

Although student outcomes were not comprehensively measured in this study, efforts were made to determine how the students used telecommunications and also how effective the technology was as a tool in the curriculum. The students' communications were collected and analyzed.

Following initial training, all the participating teachers met to plan telecommunications activities for their classes. Since the end of the school year was only six weeks away, it was decided that each class would write a letter of introduction with some specific information about what they were doing. These letters were sent at the rate of two per week, with the teachers assigned a date for transmitting their letters to the BBS.

Early the following September, the teachers from the two schools met to plan telecommunication activities for the Fall. Both the fourth and sixth grade teachers decided to integrate telecommunications into their social studies programs. The sixth grade teachers developed a "Mystery Country" contest and the fourth grade teachers decided to have the students share "Trivia" questions on local history.

Instrumentation and Data Collecting Procedures

The researcher developed instruments to collect demographic data (Appendix B) from the teachers, to determine previous experience in computer education (including previous teaching with or about computers), and to learn their perception of the school's support of innovations (Appendix B), along with the teachers' log of time on-line. The demographic data provided by the teachers included present curriculum responsibilities, years of teaching experience (which some consider a factor in the acceptance rate for innovation) and initial and present qualifications.

The Computer Background Questionnaire examined the role of the principal in facilitating innovative practices and drew on the theory of schools as loosely coupled systems (Weick, 1976) in contrast to the model of the principal as the gate keeper of innovations (Berman and McLaughlin, 1978). Linked to this concern were questions on the teachers' perception of the principal's encouragement to participate in inservice programs.

The teachers' log sheet were to record how much practice in the use of telecommunications the teachers were getting as they developed new skills.

The researcher also downloaded and kept hard copies of transmissions by the teachers on the BBS. These records provided information on the success and frustrations being experienced by the teachers, as well as their reflections concerning telecommunications. The electronic messages which were exchanged between students and classes were also collected and analyzed. The researcher looked at the content and the kinds of learning that were taking place through the messages and the degree of student participation in these activities.

After the training and initial implementation phase, each teacher was interviewed using the Level of Use Interview developed by Loucks, Newlove, and Hall [1976], (Appendix B). The information collected with this instrument plus the researcher's observations would indicate the teacher's level of use of the innovation. This is an attempt to operationally define various stages of innovation user behavior, i.e., what the user is doing. It does not focus on attitudinal, motivational, or other affective aspects of the user.

Data Analysis

The analysis of the data collected during the skills development and implementation phases was organized around the major research questions:

1. Did the teachers develop a knowledge and skill in the use of telecommunications as a result of the training?
2. Has there been a change in the teachers' concerns and attitudes toward telecommunications that can be attributed to the training?
3. Did the teachers' instructional and professional use of computers change as a result of the training?
4. Has there been a change in the instructional use of computers by the students of the inservice teachers that can be attributed to the training?

Although there was an experimental intervention (training), the exploratory nature of this study and the diversity of teacher abilities and characteristics suggests a case study reporting procedure.

Evaluation of Inservice Training Program

The content of the inservice training program and the presentation of the material (that is, the quality of work being done by the inservice facilitator) were evaluated by the

participants at the end of the training phase. The researcher developed an instrument (Appendix B) for use in the participant evaluation of the inservice training. This instrument was based on one presented by Moursund [1989, p 15-18] for the evaluation of computer inservice training.

Changes in Participants following Initial Training

Teacher knowledge of and skill with telecommunications and their concerns and attitudes towards this innovation were determined by examining the teachers' evaluations of the inservice training, the individual logs of on-line use, the hard copy of electronic messages between trainers and teachers, teacher feedback, observations, the Levels of Use Interview [Hall, et al., 1976], and the Stages of Concern Questionnaire [Hall, et al, 1979].

Degree of Success in Implementation

To determine participants' rate of progress and success with implementation of telecommunications activities in their classrooms, five sources of data were examined. They include the teachers' logs of on-line use, observations, the Levels of Use Interview [Hall, et al., 1976], the States of Concern Questionnaire [Hall, et al., 1979], feedback from the teachers, and the E-mail which was downloaded.

Student Learning with Telecommunications

The data collected was used to explore electronic communication and describe patterns of use in these fourth and sixth grade classes. Feedback was also collected from the individual teachers regarding the impact of telecommunications on their curriculum and the students' learning.

Support Structures and Barriers to Implementation

The participants' perceptions of support for implementing innovations, and possible barriers to continued implementation in their school, were collected from feedback to the trainers, observations, and final interviews.

CHAPTER IV

THE TELECOMMUNICATIONS ENVIRONMENT IN THE CLASSROOM AND COMPUTER LAB

This chapter describes the classroom, computer lab, and computer environment in which the inservice teacher training was held and the telecommunications took place. One of the major goals of this study was to document the experiences of teachers in a telecommunications inservice training program and the subsequent use of computers within each school. This environment was shaped by each of the trainers at their respective schools, and it influenced the outcome of the Telecommunications Project and this study.

This study focuses on the inservice training model developed by the researcher and the three teachers in the Apple Hill School who went through this training. The larger project group included five teachers and the lead teacher/trainer at the Bartlett School who shared in the telecommunications experience. Since the training programs at the two schools were not the same, and the context in which telecommunications took place varied significantly between the two schools, the two environments will be presented here as they influenced the results in each setting.

The Apple Hill Computer Lab

The computer lab was new to the school at the beginning of this school year. It was a mini-lab which served this school of 300 students. The room had been designed as a conference room when the school was renovated ten years earlier and was smaller than the average family living room. It was nine feet by fifteen feet. The room had two doors and no windows; the main entry led into the library and the other entered an adjoining classroom used for Chapter I classes. There was carpeting on the floor and the walls were

finished with wallpaper. The west wall had a chalk board which covered about half of the wall space and the north wall had a small cork bulletin board. The bulletin board had a display showing the menus in the Appleworks word processing program and the other walls had posters showing Logo commands. (See Figure 2 for a graphic representation of the Apple Hill computer lab arrangement.)

The room housed five computers; four were Apple IIe computers located along the north wall of the room and the fifth was an Apple II+ located along the south wall. The computer which was used for telecommunications was on a rolling computer stand, while the other four computers were on tables (not at the proper height for student use). There was also a small rolling stand holding software files which was located along the north wall. The phone line for telecommunications was located in an adjoining classroom, which necessitated running an extension line from the modem, out the door, through the library, to the phone jack in the next room. The phone line had been installed two years previously with the idea that the room would serve as a computer lab. However, the need for an ESL classroom during the current year disallowed its being used for computers.

The teacher inservice training program in telecommunications was held in this room, after school, one afternoon per week for four weeks. Since there were just three teachers in this target group, it was a workable number to gather around one computer. The teachers had no difficulty in finding time to practice during the school day, and those who chose to practice after school did so because of their own schedules and not because of the lab schedule. The computer lab was open for teachers to bring students on a sign-up basis, and it was often available for the teachers to use in the morning when these teachers had free periods.

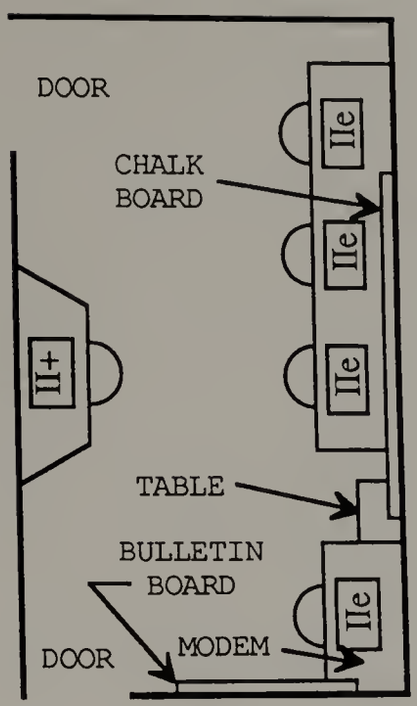


Figure 2. Room Arrangement of Apple Hill Computer Lab

These teachers also brought their students to the lab to prepare word processing documents which would be transmitted. Since all the students in a class could not be accommodated on the four Apple IIe computers available in this room, the rest of the class would work in the adjoining library area. Usually these classes made use of the computer lab in the afternoon so that they would be able to make use of two additional computers housed in the adjoining Chapter I classroom, there being no Chapter I classes in the afternoon.

Changes During Later Implementation Period

The computer lab at the Apple Hill School had been an experiment which was not continued the next school year. When the new school year started, the computers were assigned to classrooms, with each class involved in this project receiving a computer. This made it easier for the teachers and students to get the word processing files ready to transmit on the BBS during the period when telecommunications was being integrated in the curriculum. It also resulted in the students in these classes having greater access to the computer. The computer which had telecommunications capabilities was also assigned to a classroom. This meant that it had to be moved to the library where the phone line was located when anyone was telecommunicating. The result was that that computer remained in the library much of the time when it could have been in a classroom.

The Telecommunications Classroom at Bartlett School

Bartlett School had a very different setup. There was no computer lab and the computer and phone line for telecommunications was located in the front of the lead teachers' (trainer) sixth grade classroom. This was the reading classroom and the sixth

grade students rotated in and out of this room throughout the day. There were enough seats for twenty-four students in this thirty foot square classroom. The only time this room was empty during the day was when this lead teacher (trainer) had a free period, and that was the first period each day except Friday.

This room was located on the second floor at the far end of the north wing of the building. Entry from the hall was in the southeast corner of the room, as was the only other exit from the room, going into an adjoining sixth grade room. (See Figure 3 for a graphic representation of the classroom arrangement.) As you entered the room, on the left (south) wall there was a chalkboard with two small cork bulletin boards at either end, covering most of this wall. The bulletin board closest to the door displayed student work, and the one at the far side had a display of the class Honor Roll. Large posters made by the students were above the chalkboard. These posters continued all the way around the room. Next to this wall were located two computers and two bookshelves. The west wall had windows for most of its length, with counters and a heater under them. There was a tall bookcase next to the windows in the southwest corner, and two file cabinets and a tall steel cabinet in the northwest corner. One of the file cabinets was in front of the end window.

The north wall was covered with a chalkboard and two small bulletin boards at either end. These bulletin boards contained student work. There were two computers against this wall, one of which was used for telecommunications. Along the same wall was a table which stuck out at a right angle and two book shelves, one of which was on wheels. The south wall was covered with a bulletin board for half of its length, and under this was a counter with shelves and a sink. This bulletin board had a large display of a computer keyboard, the keys made with styrofoam boxes and shoe boxes. Between the

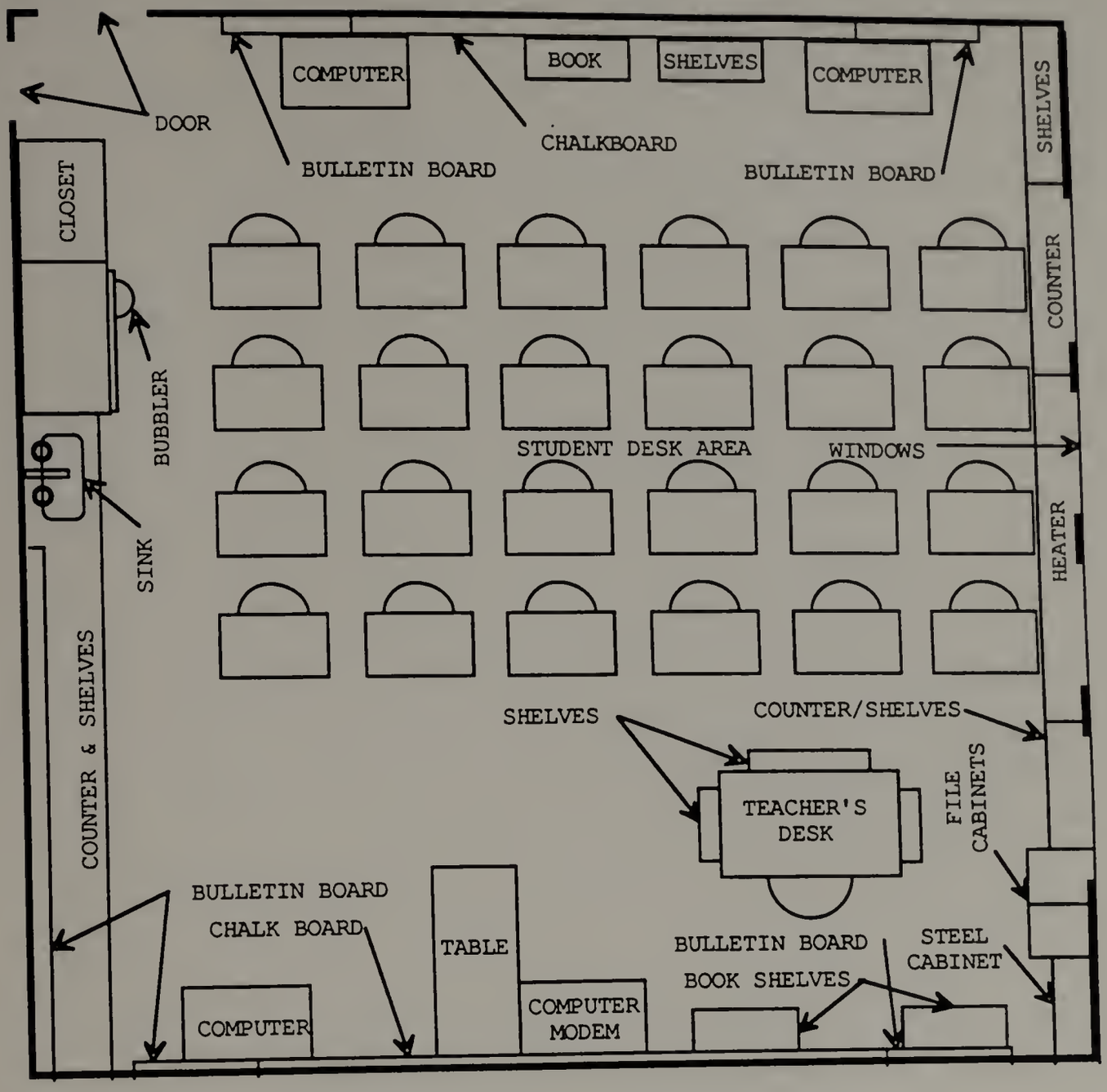


Figure 3. Room Arrangement of Bartlett Classroom

sink and the door was a bubbler and closet with sliding doors. The room had a tiled floor and cement block walls. The teacher's desk was located in the northwest corner of the room, and the twenty-four student seats were arranged in six rows of four each, facing the teacher's desk (and the computer used for telecommunications).

The inservice training program in telecommunications for the Bartlett School was held in this room. The trainer for this school was the sixth grade reading teacher and the computer coordinator for the building. This teacher had completed a graduate program in computer applications and had taken a college course in telecommunications. There were five teachers in the training program at this school. They met only once as a group after school (and there was one person missing). For the most part, the training was done on a one-on-one basis during the day or after school. The only time that the classroom was free of students was during the first period four days a week, but the trainer encouraged the teachers to come in and practice while class was in session. At least one of the teachers came in before school to practice when there were no students in the room.

Patterns of Development Phases

The teachers at the Apple Hill School went through the inservice training model outlined in Chapter I and described in Chapter III under Procedures: Phase 1, but the teachers at Bartlett School did not.

The trainer at the Bartlett School met numerous times with the researcher both in-person and on-line to plan this training program, and he had intended to follow this model. All lesson plans and handouts were provided by the researcher. As it turned out, the

training of the teachers at the Bartlett School was not structured and did not follow the plans provided. Except for one group meeting, the training was done on a one-on-one basis. The weekly assigned practice was not completed by this group of teachers--one of the teachers never practiced and the others practiced only once or twice.

> From ->BARTLETT GOODE[1].(#151)
> Date ->03/29/89 16:36:44
>
> HI!
>
> IT'S WEDNESDAY NIGHT AND YOU HAVEN'T SENT ME ANY MAIL AS PRACTICE FOR YOUR TELECOMMUNICATIONS LESSON.
>
> PLEASE COME INTO MY ROOM WHENEVER YOU WANT TO SEND THE BRIEF NOTE THAT YOU WILL FIRST WRITE USING APPLEWORKS IN YOUR OWN ROOM (OR AT HOME). LOOKING FORWARD TO OUR NEXT MEETING TOMORROW MORNING. SEE YOU THEN.

It was reported that the five teachers could not find a convenient time when they all could get together for training sessions. One teacher reported in her interview that she was never able to stay for after-school meetings because of other family commitments. The trainer at this school reported being frustrated by the lack of cooperation or interest from this group of volunteer teachers.

By the middle of May, the trainer gave up and did much of the work for them. He went into their BBS accounts and downloaded their mail for them. He gave the teachers this note along with their mail:

---

1 The names of all participants have been changed to maintain their anonymity.

Elaine-

I went into your bulletin board account and retrieved all of your mail as of this morning (Monday). Hopefully this will help you with your busy schedule. Some of it is very "old" mail.

Please read everything and try to respond to anyone that has requested a response.

Remember all the teachers are expecting a "class letter" from your class on Tuesday, May 31. (That's the day after the long weekend).

If you need help, see me.

Robert

Two teachers reported to the researcher in their interviews that they did not log on to the BBS and send the letter from their class. They wrote the letter and gave it to the trainer to send for them. There was an extenuating circumstance: the teachers were away with their classes for a three-day field trip at a nature center when the E-mail was scheduled to be sent. The sending date, however, had been picked only three or four weeks earlier!

There were three barriers that contributed to the difficulty of fully implementing telecommunications at Bartlett School.

The first was the environment in which the telecommunications took place. In interviews with these teachers, the researcher learned that several teachers objected to the location of the telecommunications equipment. They were uncomfortable having to go into a classroom full of students to experiment with this new technology.

The second was one of commitment to the project. These teachers put other things first and did not plan for telecommunications in their schedules. The lack of commitment

may have been influenced by the negative feelings toward the environment, as well as interpersonal problems among that staff.

The third was the attitude of the trainer at Bartlett School. At the end of the project, he indicated that he had had the feeling from the beginning that the teachers in his school "had little interest in computers." In effect he was turning the teachers off to using telecommunications. He made the arrangements for the phone line to be located in his classroom so that it would be convenient for him, without consideration for the other teachers who needed to use it.

CHAPTER V

FINDINGS

The purpose of this study was to test the effect of an innovative training curriculum and strategy on teacher acquisition of telecommunication skills and the implementation of this technology into their curricula. Results are reported in three major areas:

1. Development of teacher skills in telecommunications following initial training,
2. Implementation of telecommunications in the classroom, and
3. Student use of telecommunications.

As this study evolved, it became apparent to this researcher that not all nine participants in the Telecommunications Project were receiving the training outlined in the Teacher Training Model in Chapter I. It therefore became necessary to limit the evaluation of the Training Program to those teachers who completed the training as designed, with this group of three teachers now referred to as the "target group" in this study. The findings on the levels of use and implementation of telecommunications, which were collected at the end of the initial implementation in June of 1989, includes both the teachers who completed the training program as outlined and those who did not. Thus the outcome of the two experiences provide a valuable comparison when considering the merits of the training program. However, the small sample size and disparate experiences of the two groups limits the conclusions drawn from these findings.

Development of Teacher Knowledge and Skills with Telecommunication

Previous Computer Experience

Paula, Linda, and Rhoda were the three teachers in the target group who participated in the inservice training at the Apple Hill School. Of these, Linda had slightly more computer background because she had attended more computer workshops. However, she rarely used computers either personally or with students, and when she did, it was drill, practice, and games. She considered herself a beginner. Both Linda and Paula had taken workshops in the use of Appleworks but reported seldom using it, and only Paula had tried using it with students.

Paula had taken her first computer workshop eight years earlier which resulted in her being totally turned-off to computers! The workshop, a course in BASIC programming, had been taught by a math teacher who gave homework assignments in trigonometry! Paula was computer-phobic, considered herself a beginner, but felt that she needed to learn and do more with computers. From the observations of this researcher, Paula was the teacher putting the most effort into getting her students to use computers.

Rhoda, on the other hand, had never used computers nor did she have any knowledge of computers. Five years ago she had rewarded her students once a week with computer games, but since then had done nothing with computers. Nor did she consider herself a competent touch typist.

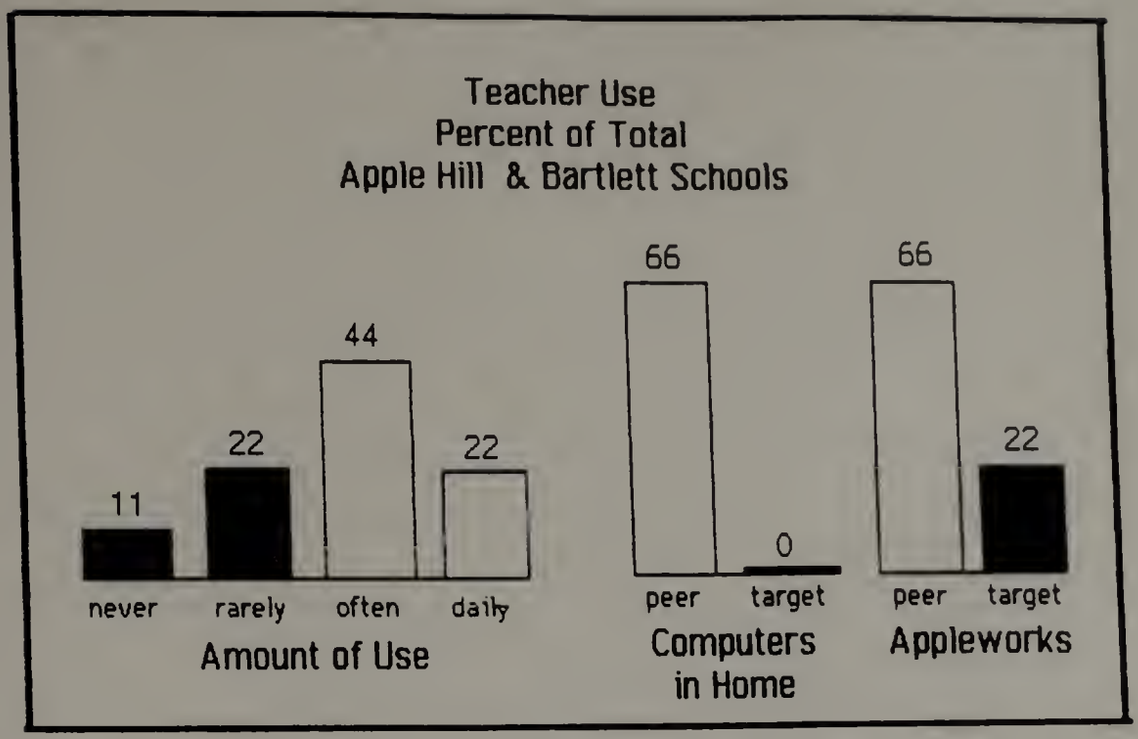
Since Rhoda had never been exposed to the Appleworks word processing program and since Linda and Paula seldom used it, a workshop was provided to introduce Appleworks to Rhoda and to serve as a refresher for the others. The workshop was held once a week, for an hour after school, prior to the beginning of the telecommunications

training program. Rhoda and Paula attended all three hours of the Appleworks workshop, but Linda only needed one of the hours to refresh her skills.

Rhoda was the youngest of the three teachers and had taught for eleven years, while Linda and Paula had taught for twenty-one years and thirty years respectively. This is noted since amount of teaching experience is believed by some to be correlated with openness to curriculum innovation. However, researchers disagree on the relationship between teaching experience and the implementation of innovative projects. Berman [et al., 1978] found that the more experienced teachers were less open to innovation, while Hall [et al., 1979] found no relationship between such demographics and the implementation of innovation.

The three teachers at Apple Hill School had less computer experience than did the teachers at the Bartlett School. They personally used computers less than the Bartlett School teachers (See Figure 4) and, consequently, their students were receiving less computer time than the Bartlett School students.

There were some extenuating circumstances which contributed to this disparity between the two groups of teachers and the students in the two locations. The first was the fact that the teachers at the Bartlett School had been a part of the Governor's Initiative Program and, as a result, had each been given a computer for personal use at home. As a part of the Initiative Program, they had also received intensive instruction in computer use, which included Appleworks, Grade Manager, Print Shop, etc. The teachers at Apple Hill School were not part of this program, and therefore had not been given a computer for use at home or received the intensive instruction. Also, the two schools represent different



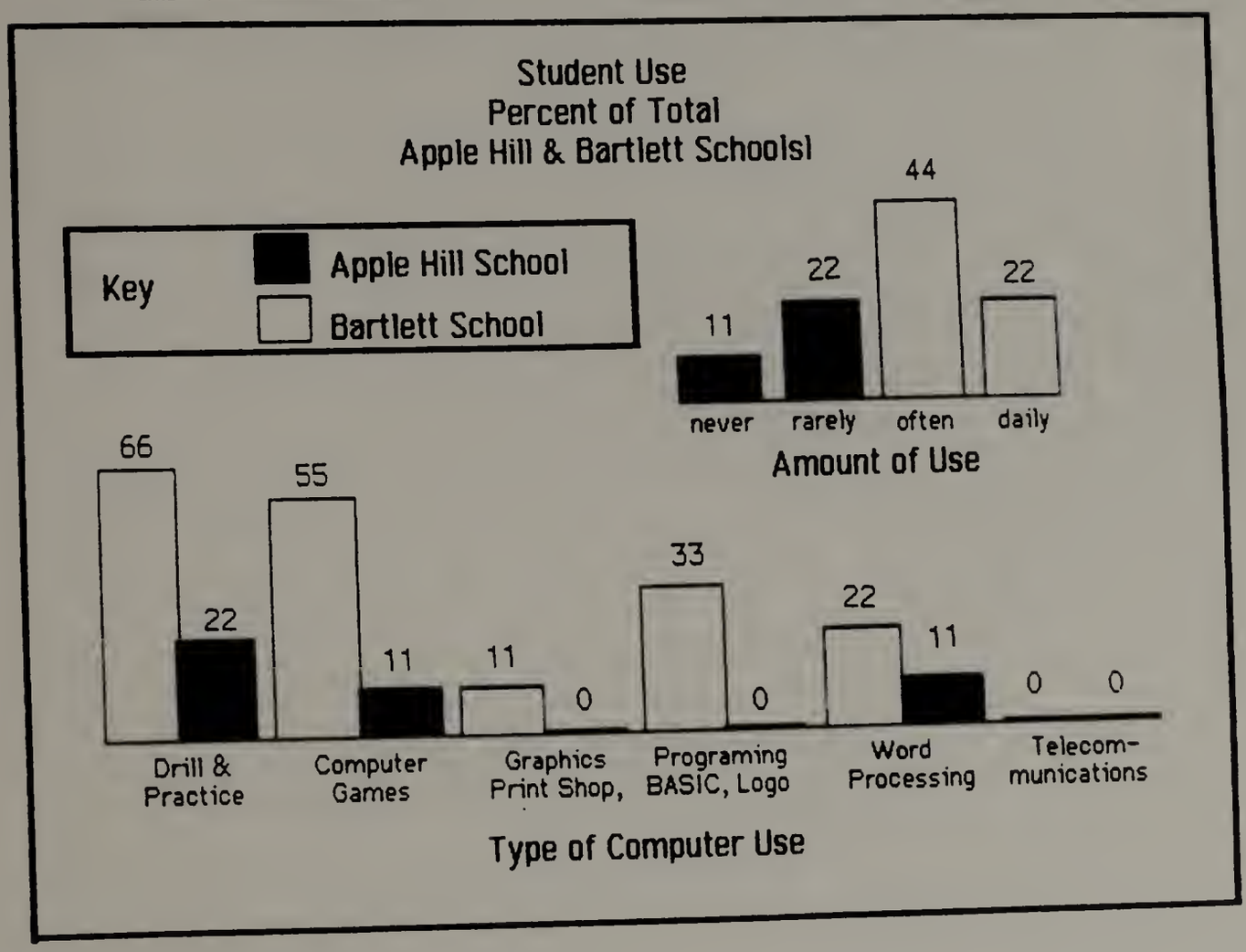


Figure 4. Types of Computer Use Before Study

socio-economic neighborhoods; the parents at Bartlett School pushed for computer use by their students and, as PTO members, gave several computers to the school, which doubled what had been provided by the district. In sum, Bartlett School had two advantages: better equipped and prepared teachers, and more available hardware and software in the school.

Participant Evaluation of Inservice Training

The researcher developed an instrument (Appendix B) for use in the participant evaluation of the inservice training. This instrument was based on one presented by Moursund [1989, p. 15-18] for the evaluation of computer inservice training. It helped the researcher review the content and presentation of the inservice program, the related computer background of the teachers, the teachers' attitudes toward computers, and changes that resulted from this training program. The participants completed the evaluation form at home and mailed it back to the researcher, with 100% of the teachers responding.

It was found that all the teachers felt more competent with computers as a result of the inservice training. Responses to the "most positive aspect of the workshop" included:

"Building confidence in the use of computers for myself and my students."

"My attitude towards using computers really improved."

They agreed that the curriculum handouts (Appendix B) clearly explained how to move through the telecommunications process. This group of teachers unanimously agreed that the workshop had been organized in a way that facilitated learning. The peer group was supportive in the coaching process [Showers, 1982] that was an integral part of the training design, and the teachers reported having learned a great deal from other participants in the inservice training. As a group, they felt that the hands-on computer time in the workshop had been shared equally. Since there was only one computer connected to the

phone line, this necessitated taking turns on the one computer; and the only time when all participants could simultaneously be on computers was when they were using Appleworks to transfer ASCII files.

The telecommunications material covered by the inservice training was not familiar even to the more experienced computer user in this group. The seven articles in the Bibliography marked with asterisks were made available to the teachers to provide information and theory on the use of telecommunications in the classroom. The trainer also sent additional information (Appendix A) via E-mail to each of the teachers.

Though the teachers in this inservice training program were committed to using telecommunications with their students as a part of the innovative project funded by the school district, two of the teachers (Linda and Paula) were not sure whether the inservice training was relevant to their classrooms--they gave it a neutral rating of 3. The third teacher (Rhoda) thought it very relevant to her classroom, giving it a rating of 5--the highest agreement rating.

Linda appeared to be the most self-assured in using the computer, with Paula being somewhat computer-phobic and Rhoda a novice. These levels of experience appear to have had a relationship to each participant's perception of the rate of speed at which new material was presented in the training program. The more experienced and self-assured user (Linda) felt the progress of the workshop was somewhat slower than she would have liked (rating 4), while the other less experienced or inexperienced participants felt it was faster than they would have liked (ratings 1 and 2). Linda also reported that the workshop did not increase her understanding of how to use computers as a problem solving tool in her classroom, while both Paula and Rhoda reported having made gains in this area.

Teacher Skills with Telecommunications following Initial Training

The primary focus of this study was the capacity of teachers, relatively inexperienced in computer use in education, to develop personal skills in using telecommunications. This development in knowledge and skill was analyzed by examining each teacher's individual logs of on-line use, responses on the Levels of Use Interview [Hall, et al 1976], success in completing assignments, and copies of electronic messages which were sent to other teachers and the trainer. Their attitudes and concerns, being developmental indicators of movement through stages [Hall, et al., 1979] in adoption of an innovation, were examined using the Stages of Concern Questionnaire [Hall, et al., 1979].

During the inservice training, the teachers were given assignments (Appendix A: Lesson Plans) to complete between training sessions. These assignments, in which they sent E-mail to each other and the trainer, were to give the participants practice in using newly learned telecommunications skills. These early messages expressed some of their frustrations in learning to use telecommunications and some problems they were experiencing during the training phase. The on-line assignments were completed by all participants in the target group either working in pairs or being coached by the trainer.

From ->APPLE HILL RICE (#16)
Date ->03/30/89 10:00:19

HELLO
153,154,155,35,36,38,39,41,and 151,

This is one insecure person looking for someone to commiserate or lament my plight of slow learner in this highly technical world of telecommunications. Going on line, Appleworks, modem, uploading, downloading, E-mail, etc. I'm sure there must be some order here. At what point do we determine slow or retarded? Does this mean that I am not downloading? Please don't think that I have an attitude problem. It has more to do with teaching an old dog new tricks.

To keep from becoming just a number, let me introduce myself. My name is Paula Rice and I'm a sixth grade teacher at Apple Hill School.

Thank you for listening.
Paula (16)2

From ->BARTLETT GOODE (#151)
Date ->03/31/89 07:54:20

Hi!

I've just received mail from Paula Rice - as a matter of fact I received the same mail seven times. Sounds like she needs some tutoring. She did a bulk mail to just about everyone involved. I bet they all get the same message repeated. That will certainly confuse them a little.

I tried going on line with 1200 baud today and got nothing but garbage on the screen. Any suggestions. I'm really sick of the SNAC Logo and I thought this would help to speed up the process. I guess it didn't!

I have a couple of the people willing to stay after school on Thursday April 6th for a Remote to Remote demo. Are your people going to be there. Send me details.

From ->APPLE HILL GORDON (#155)
Date ->04/03/89 12:22:42

April 3, 1989

Dear Computer Friends,

This letter is to introduce myself to you. Hopefully you all know more about computers than I do. My son in first grade probably knows more about computers than I do. But I'm trying. Besides teaching fourth grade and everything that goes along with it, including correcting papers, writing lesson plans, parent conferences, attending committee meetings and workshops after school, I am also the mother of three children, one of whom is a four-month old baby who keeps me up at night. Now finding time to learn how to use the computer has been difficult, but we have a very patient teacher over here who is experienced in teaching slow learners. But I really do feel overwhelmed by the whole thing, to tell you the truth. Now that I'm finished whining, I'll end this letter and see what exciting mail you've all sent me.

Yours in computer land,

Rhoda Gordon

From ->APPLE HILL RICE (#16)
Date ->04/11/89 12:04:34

Dear Carol,?= Well, here we go again. I'm just practicing on my own. I guess this is the only way to gain confidence. I have already done something wrong. I have a funny little ' =;following me and I can"t seem to get rid of it. It really isn"t bothering me so I will just leave it there. '

During the fifteen weeks of Phase 1 and 2, when training, coaching, and initial implementation were taking place, the three teachers in the target sample logged-on for a total of six hours and forty-five minutes, with individual on-line sessions averaging eight minutes. The preparation off-line time far exceeded the on-line time, as all messages were

prepared off-line using Appleworks and then uploaded to the BBS. This group of three teachers had logged-on to the BBS a total of forty-four times during this fifteen week period (see Table 2). These records of on-line practice as well as the necessary off-line preparation were indications of willingness to learn the innovation.

Table 2. On-line Computer Use During Training Phases 1 & 2.

On-line Use	Linda	Rhoda	Paula	Totals
Hours	2 1/3	1 1/4	3 1/2	6 2/3
# Sessions	17	11	16	44

The three teachers in this sample made considerable gains in the use of computers and telecommunications. Rhoda came to this training program as a non-user and computer illiterate, while Linda and Paula had rarely used a computer and considered themselves beginners. By the end of Phase 2 (and the end of the school year), their knowledge and skills had grown and this researcher observed that they were each:

* familiar with the vocabulary associated with telecommunications;
* familiar with the necessary equipment and software needed for telecommunications, and knew how to use it;
* able to log-on to the local BBS and obtain a password;
* able to use the electronic bulletin board and electronic mail system;
* able to prepare text files (Appleworks) for uploading to an electronic mail system; and
* able to download E-mail from BBS to disk file and print it out using Appleworks.

The findings of the Telecommunications Inservice Evaluation Questionnaire (Appendix B) show that, while all the teachers reported a feeling of greater competence with the computer as a result of this inservice training, Rhoda and Paula also reported that they talked more to other teachers about computers. In additiion, they felt more comfortable using computers with their students; their understanding of how to use the computers as a tool increased; and they expected to increase their instructional use of computers.

Linda and Paula each arranged to take a computer and modem home for the summer so they could continue to practice their newly learned telecommunications skills. Such practice indicates not only a willingness to use the innovation but also a degree of new confidence in their ability to successfully telecommunicate without coaching from the trainer. Unfortunately there were only two computers available with telecommunication capabilities for teachers to take home during vacation. Since Linda and Paula lived in the same neighborhood, and were interested in summer practice and could be available to help each other, they were loaned these computers. Rhoda could not participate because she lived out of town. Linda and Paula were successful in sending E-mail to this researcher during the summer. They were the only teachers in this project who practiced using the BBS and telecommunications during the summer. The teachers at Bartlett School had no interest in sharing in this experience during their summer.

Trainer's Ratings of the Level of Use of Telecommunications

A further look at each participant's developmental level in the adoption process of this innovation was achieved by means of the Stages of Concern Questionnaire (Appendix B) and the Levels of Use Interview (Appendix B). These two tools, used together, gave

the researcher substantiated data on which to base evaluative judgments. These instruments were administered to the total group of nine participants who were using telecommunications for the first time. This provided a comparison between those who completed the planned Model Training Program and those who did not. The researcher conducted the Levels of Use Interview at the end of the initial implementation phase (at the end of the school year). The Stages of Concern Questionnaire was given to individual participants to be completed at their leisure and mailed back to the researcher.

The Stages of Concern Questionnaire [Hall, et al., 1979] is an instrument which examines the attitudes and concerns of participants as developmental indicators of movement through stages in the adoption of an innovation. Hall, et al., [1979] found that stages of concern about an innovation develop from early unrelated (Stage 0 & 1), to self (Stage 2), to task (Stage 3), and finally to impact (Stages 4, 5, & 6) concerns. The statements on the Stages of Concern Questionnaire arranged according to the Stage they indicate follow.

Item Number	Statement
	Stage 0
3	I don't even know what the innovation is.
12	I am not concerned about this innovation.
21	I am completely occupied with other things.
23	Although I don't know about this innovation, I am concerned about things in the area.
30	At this time, I am not interested in learning about this innovation.
	Stage 1
6	I have a very limited knowledge about the innovation.
14	I would like to discuss the possibility of using the innovation.
15	I would like to know what resources are available if we decide to adopt this innovation.
26	I would like to know what the use of the innovation will require in the immediate future.

35 I would like to know how this innovation is better than what we have now.

Stage 2

7 I would like to know the effect of reorganization on my professional status.
13 I would like to know who will make the decisions in the new system.
17 I would like to know how my teaching or administration is supposed to change.
28 I would like to have more information on time and energy commitments required by this innovation.
33 I would like to know how my role will change when I am using the innovation.

Stage 3

4 I am concerned about not having enough time to organize myself each day.
8 I am concerned about conflict between my interests and responsibilities.
16 I am concerned about my inability to manage all the innovation require.
25 I am concerned about time spent working with non-academic problems related to this innovation.
34 Coordination of tasks and people is taking too much to my time.

Stage 4

1 I am concerned about students' attitudes towards this innovation.
11 I am concrned about how the innovation affects students.
19 I am concrned about evaluating my impact upon students.
24 I would like to excite my students about their part in this approach.
32 I would like to use feedback from students to change the program.

Stage 5

5 I would like to help other faculty in their use of the innovationl.
10 I would like to develop working relationships with both our faculty and outside faculty using this innovation.
18 I would like to familiarize other departments or persons with the progress of this new approach.
27 I would like to coordinate my effort with others to maximize the innovation's effects.
29 I would like to know what other faculty are doing in this area.

Stage 6

2 I now know of some other approaches that might work better.
9 I am concrned about revising my use of the innovation.

20 I would like to revise the innovation's instructional approach.
22 I would like to modify our use of the innovation based on the experiences of our students.
31 I would like to determine how to supplement, enhance, or replace the innovation.

Figure 5. Stages of Concern Questionnaire Arranged According to Stage
Reference: Hall, G., George, A., & Rutherford, W. Measuring Stages of Concern About the Innovation: A Manual for Use of the SoC Questionnaire (2nd edition). Austin, TX: Research and Development Center for Teacher Education, The University of Texas, 1977.

It was determined that four of the participants were nonusers (Stages 0 & 1) of the innovation, while four were beginning users (Stage 3) (See Table 3). There was an equal split between users and nonusers. The one person who was at Stage 5 (Routine User) was the lead teacher/trainer at Bartlett School; this person had previously taken a college course in telecommunications, although he had not used telecommunications prior to the inception of this project.

Table 3. Frequency of Highest Stage of Concern

	0	1	2	3	4	5	6	Total
Number of Individuals	1	3	0	4	0	1	0	9

The most notable finding was in the comparison of the stages attained by the target sample of teachers from the Apple Hill School having completed the model inservice training program, and the teachers from the Bartlett School, who had not completed the model program. All three teachers from the Apple Hill School were beginning users of the innovation--they were at Stage 3 Concerns; while only one teacher new to the innovation at

the Bartlett School had become a beginning user and the other four were nonusers at Stages 0 & 1.

Table 4. Stage of Concern Percentile Scores

Subject	0	1	2	3	4	5	6
Mary	89	75	95	97	33	52	20
Linda	84	91	94	98	82	72	47
Robert	53	45	28	43	43	95	90
Elaine	98	69	55	52	19	14	3
Beth	23	99	63	52	30	68	20
Sally	72	80	76	27	30	72	22
Rhoda	60	90	87	97	33	84	60
Milly	84	84	35	80	7	9	9
Paula	77	90	59	88	7	22	1

Hall, et al [1979, p. 30] instructs that when two scores are within one or two percentile points, both should be circled as peak scores. Usually, these scores will be adjacent to each other, but this is not the case for Paula.

A closer look at the individual profiles of the teachers (which were obtained from the Stages of Concern Questionnaire) along with an explanation of the stages, will follow. Looking first at the profiles of the teachers in the target sample:

Both Linda (Figure 5) and Rhoda (Figure 6) have peak scores at stage 3 which indicate a high concern about time, logistics, or other managerial problems related to the innovation, with their attention focused on the processes and tasks of using the innovation. Linda's relatively high level of personal concerns (Stage 2) shows that she is still somewhat uncertain about the demands of the innovation, her inadequacy to meet those demands, and her role with the innovation. She is not concerned about working with others (low Stage 5). Rhoda is more concerned with learning more detail and information about the general characteristics, effects, and requirements for using telecommunications (Stage 1), and she is not concerned with the impact of the innovation on the students (low

Stage 4). Both Linda and Rhoda had extremely high total scores, 95 and 89 respectively, which may be an indication of the intensity of their concern and definite feelings and involvement with the innovation.

Paula's (Figure 7) profile is unusual because the peak scores are not adjacent. She is very concerned with the processes and tasks and the managerial problems of using telecommunications, which suggests she has moved on as a beginning user of the innovation (Stage 3); so, she was placed at Stage 3 in Table 4. She is equally concerned with learning more detail and information about telecommunications and the general characteristics, effects, and requirements for using it (Stage 1). Her personal concerns are low and she, like Rhoda, is not concerned with the impact of the innovation on the students.

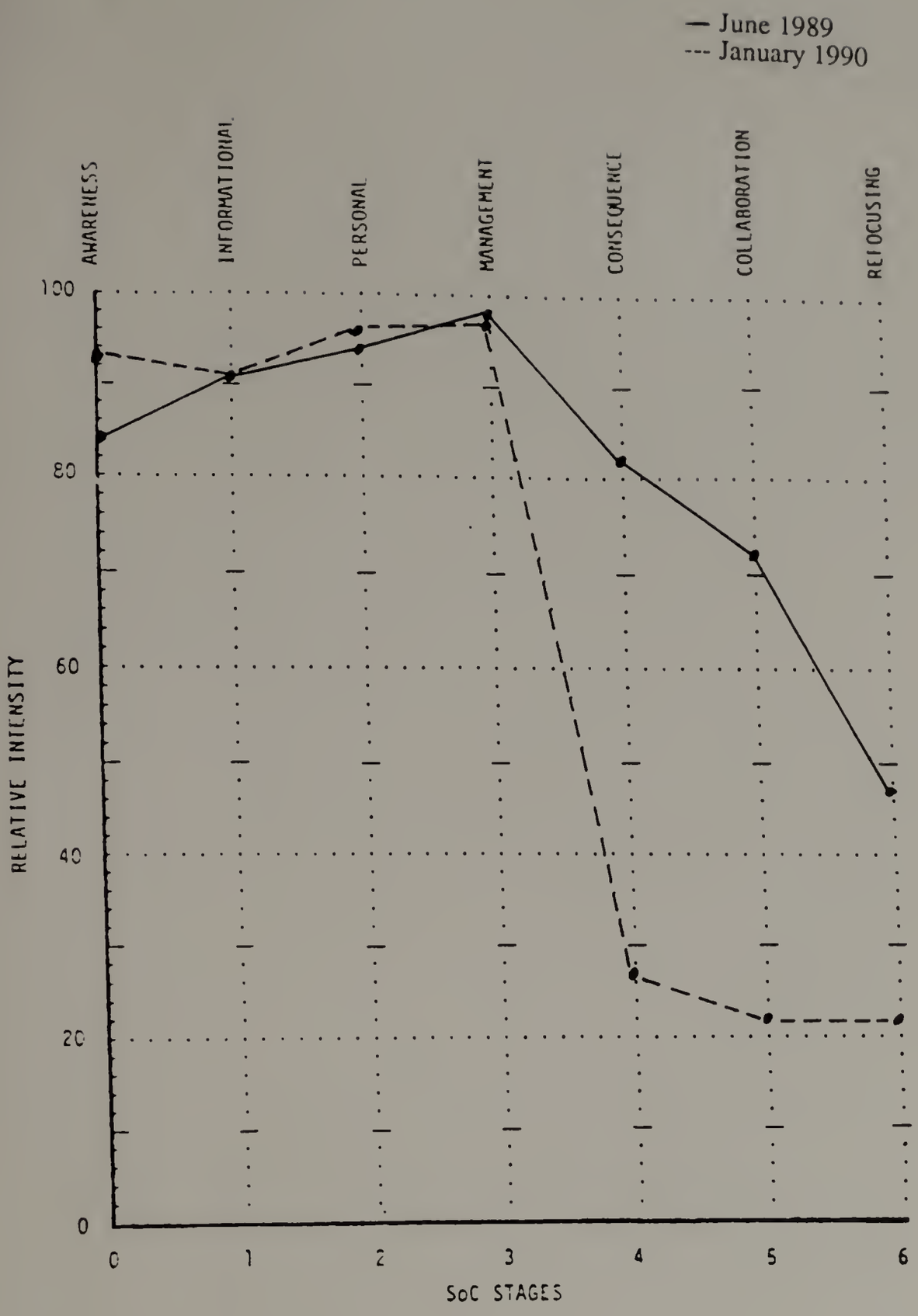


Figure 6. Stages of Concern Profile -- Linda

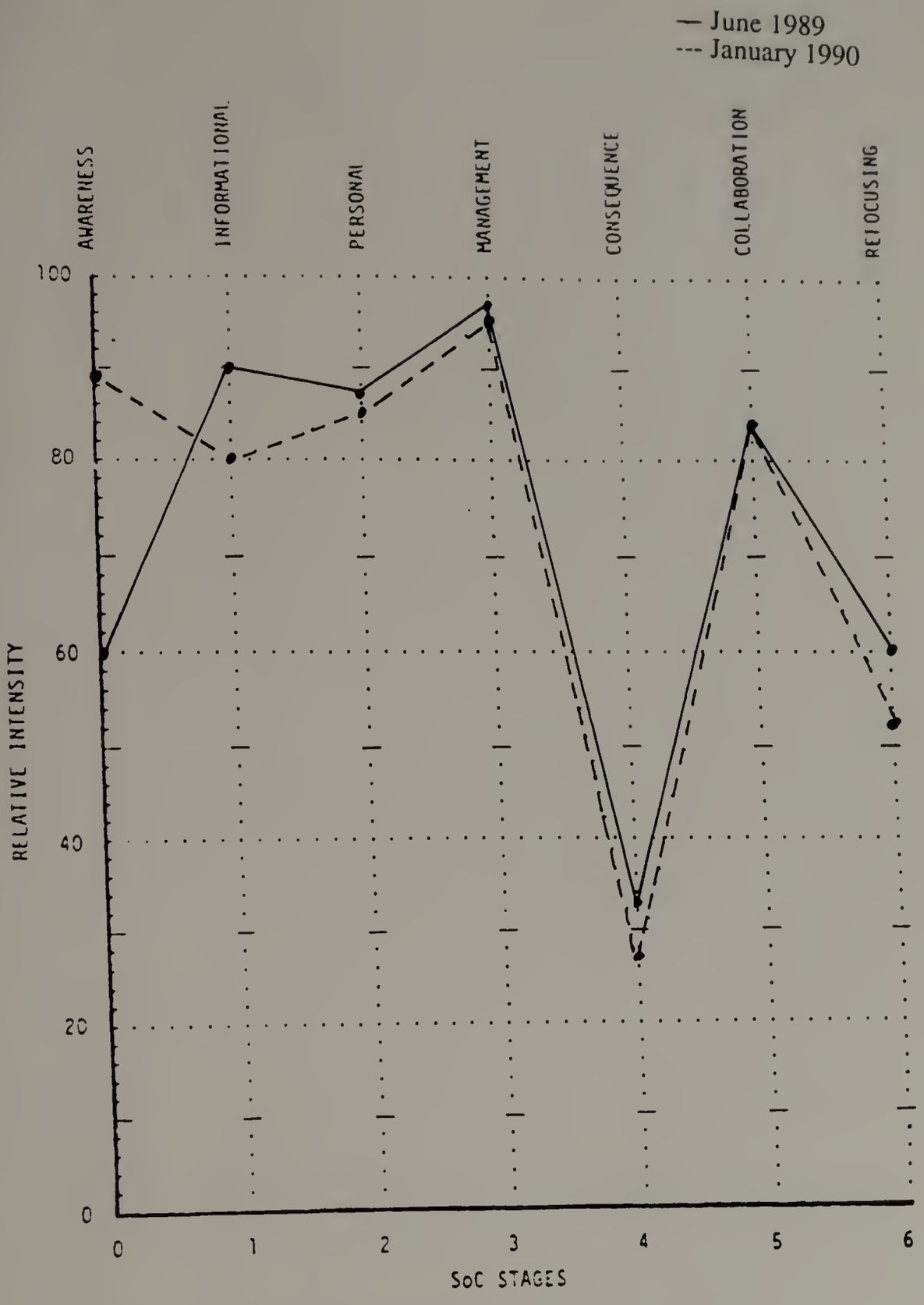


Figure 7. Stages of Concern Profile -- Rhoda

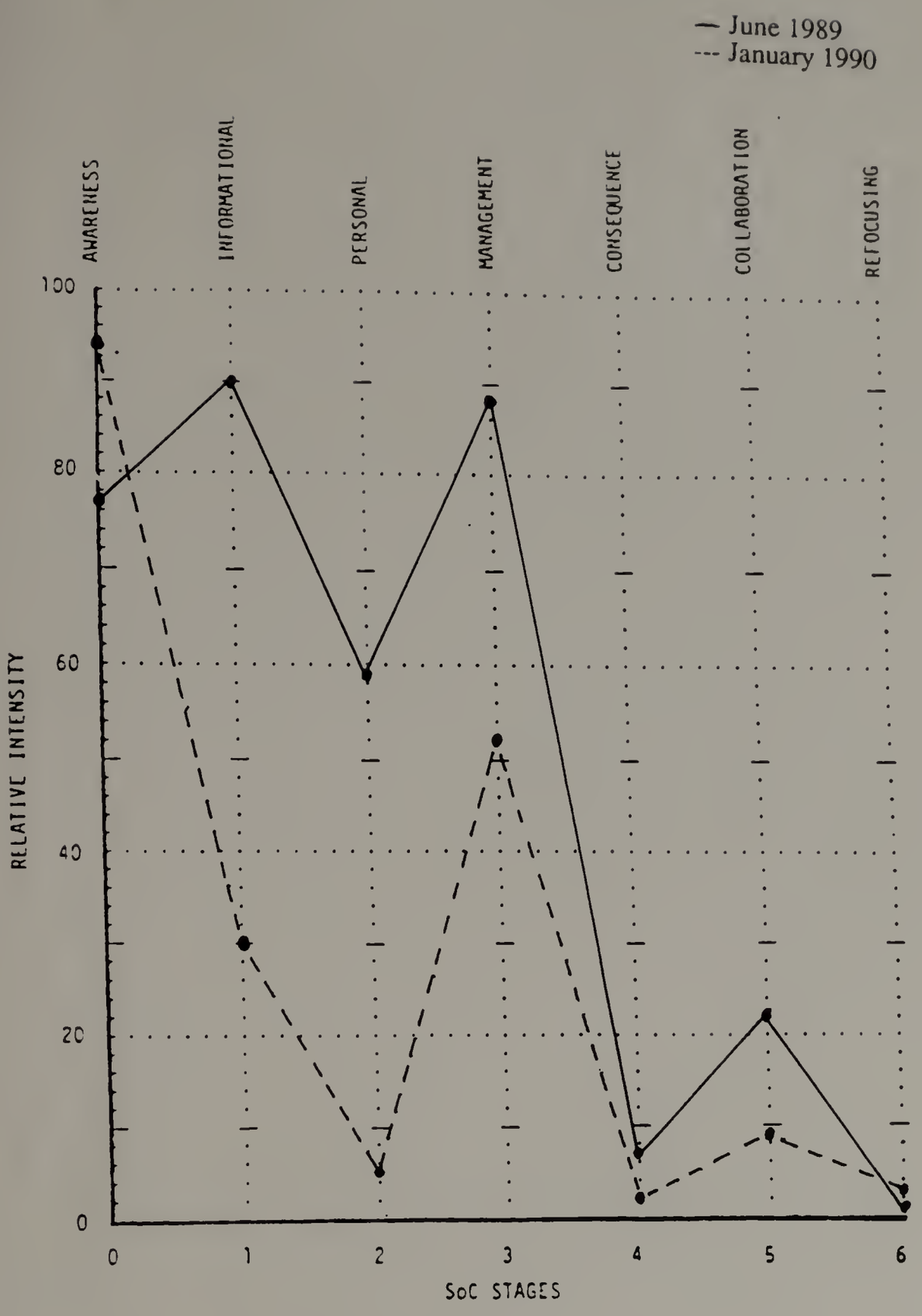


Figure 8. Stages of Concern Profile -- Paula

We now look briefly at the profiles of the teachers at Bartlett School who did not complete the model inservice training program, but with whom the target sample of teachers at Apple Hill School were communicating:

Mary (Figure 8) was the only teacher in this group who had become a user of telecommunications as a result of this project, and she had two peaks of concern: Management (Stage 3) and Personal (Stage 2). Her profile is similar to Linda's, but her personal concerns are more intense. She has not moved on to the impact concerns of Stages 4, 5, and 6. Robert (Figure 9) was the lead teacher/trainer at the Bartlett School and his profile is typical of team leaders. He is heavily concerned about working with his colleagues in coordinating use of the innovation (Stage 5) and does not reflect an intense concern about students (Stage 4). Milly (Figure 10) is a nonuser who is just becoming aware of telecommunications (Stage 0), has a limited knowledge and wants more information on the requirements for its use (Stage 1). It appears that she is closer to becoming a user of the innovation than the remaining nonusers, due to the relatively high management concern (Stage 3).

Beth (Figure 11) and Sally (Figure 12) have similar concerns which include an unusual combination. They are both nonusers wanting more information (Stage 1) yet highly concerned with collaboration (Stage 5), which is unusual for nonusers. Since telecommunications requires collaboration, this stage might have a different significance than it would have in other innovations; however this did not seem to be the case with the beginning users here. From data gathered in an interview with Beth, this researcher discovered that this particular teacher has had a classroom pen pal relationship for several years with a school in Alaska and the Alaskan class has used a modem. This teacher's interest in possible future telecommunication with the class in Alaska undoubtedly accounts

for the answers that placed her high in Stage 5. Beth has a moderate concern with management (Stage 3) and Sally is not at all concerned with management.

Elaine (Figure 13) is not concerned with this innovation. In the questionnaire, she said she was not interested in learning about telecommunications because she was so occupied with other things. Since she volunteered to be a part of this project, this seemed strange until the researcher learned from her interview that shortly after this project began, Elaine became the director of the gifted program for her school, and that this program was taking most of her time.

The Level of Use Interviews [Hall, et. al., 1975], which had been tape recorded, were transcribed and analyzed by this researcher using the Level of Use Rating Sheet (Appendix B) and the Scale Point Definitions (Appendix B) as defined by Hall [et. al., 1975, p.54]. The findings were similar to those for the Stages of Concern, with any variation in the Stages and Levels assigned to individuals attributed to the fact that one dimension is focusing on feelings, the other on performance.

The results from the Level of Use Interviews correlated well with the Stages of Concern Questionnaire (see Table 5 and Figure 14), showing the same four teachers to be non-users. However Sally, who was at Stage 1 Concerns, was found to be at Level 2 Use. The four teachers who were at Stage 3 Concerns (Management) were found to be at Level 3--Mechanical Use; and Robert who was at Stage 5 Concern, which is collaboration, was found to be at Level 4A Use--Routine use.

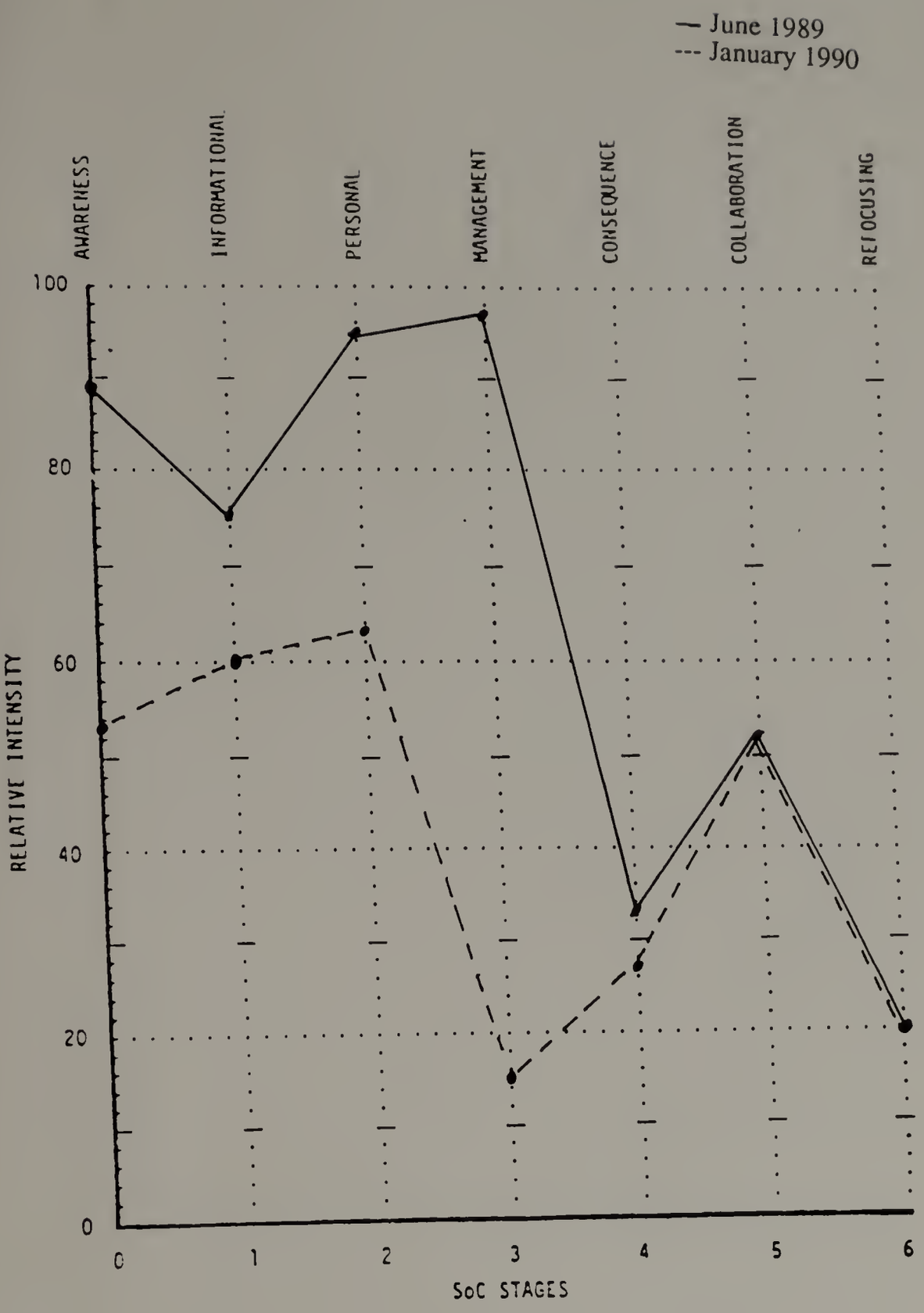


Figure 9. Stages of Concern Profile -- Mary

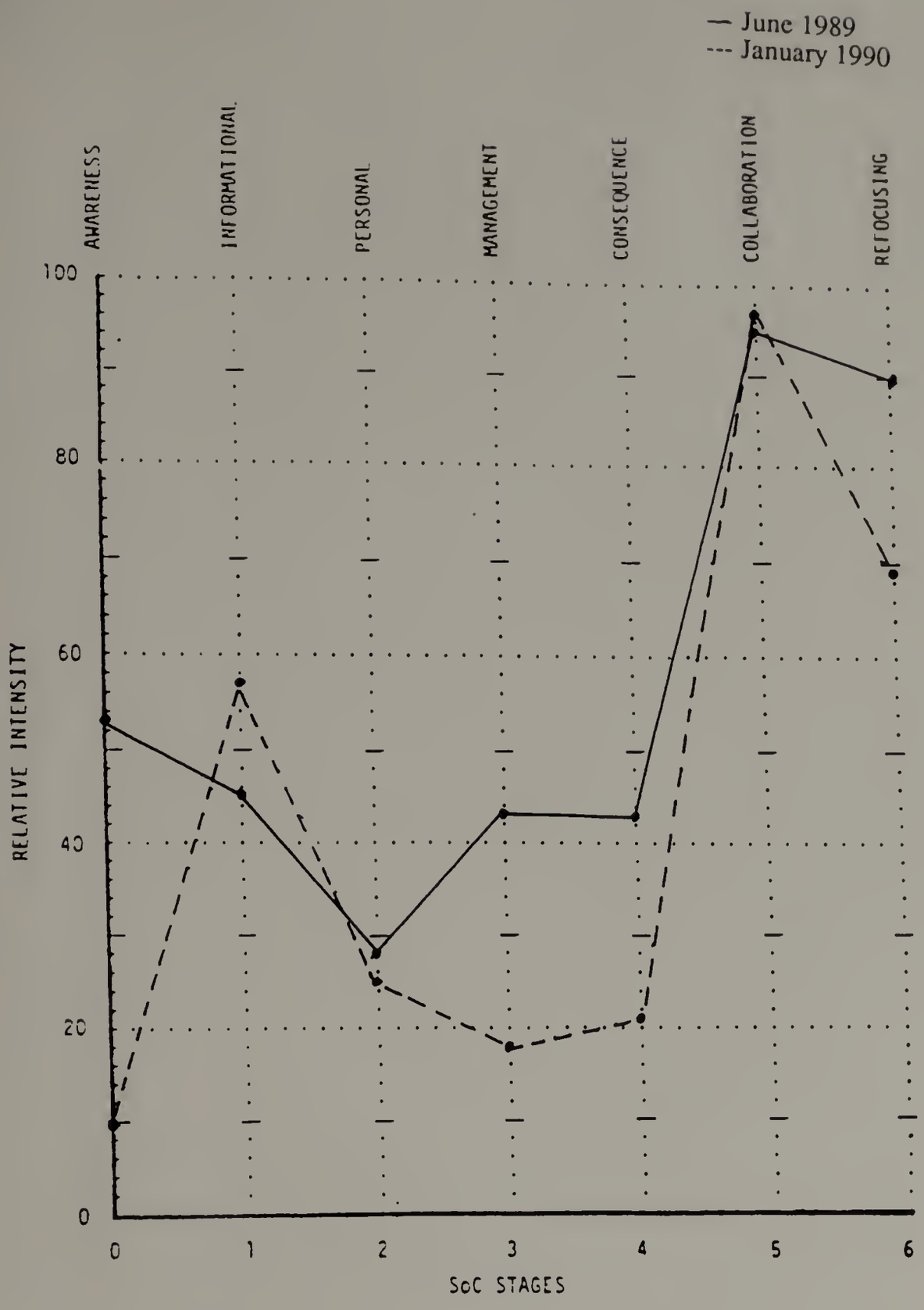


Figure 10. Stages of Concern Profile -- Robert

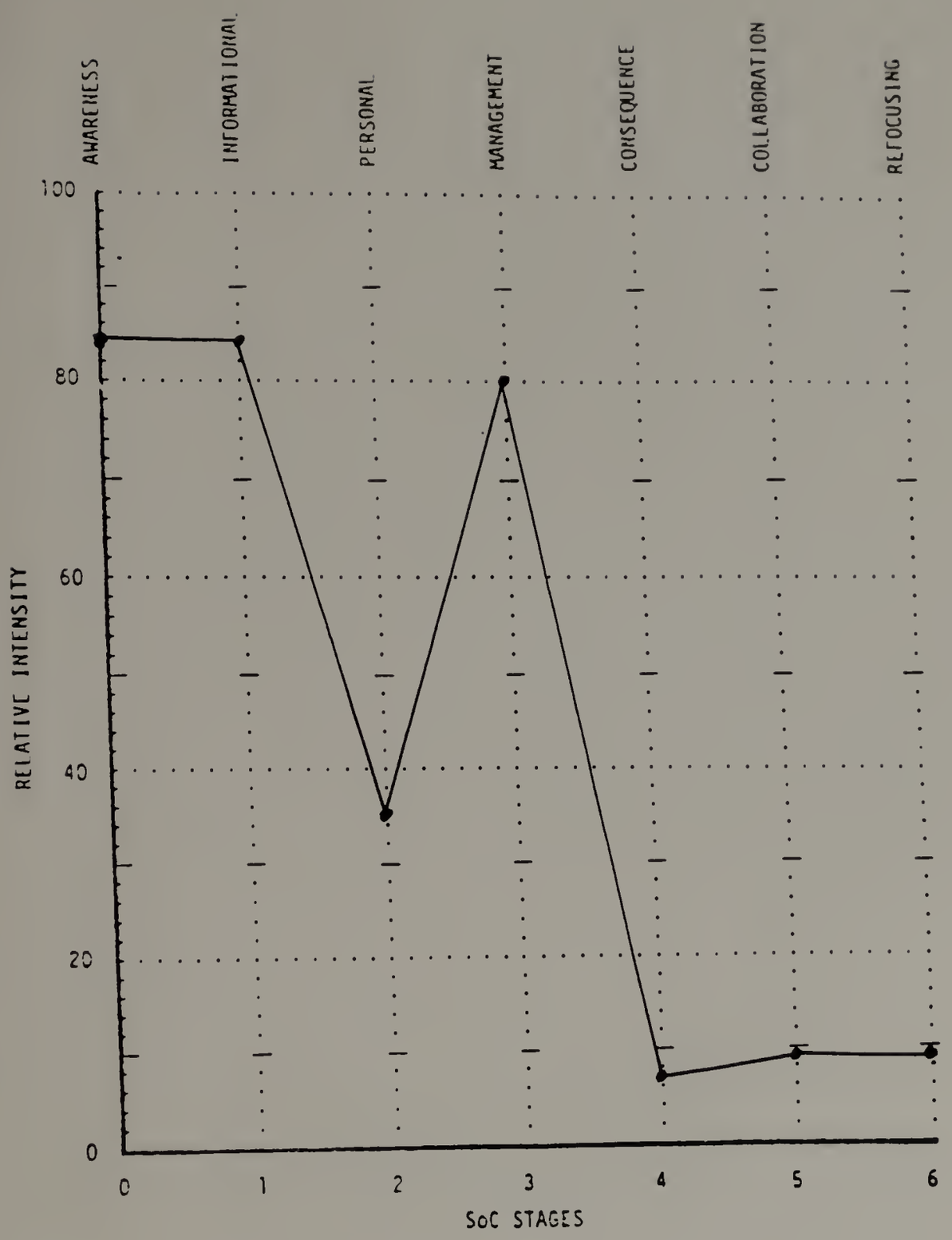


Figure 11. Stages of Concern Profile -- Milly

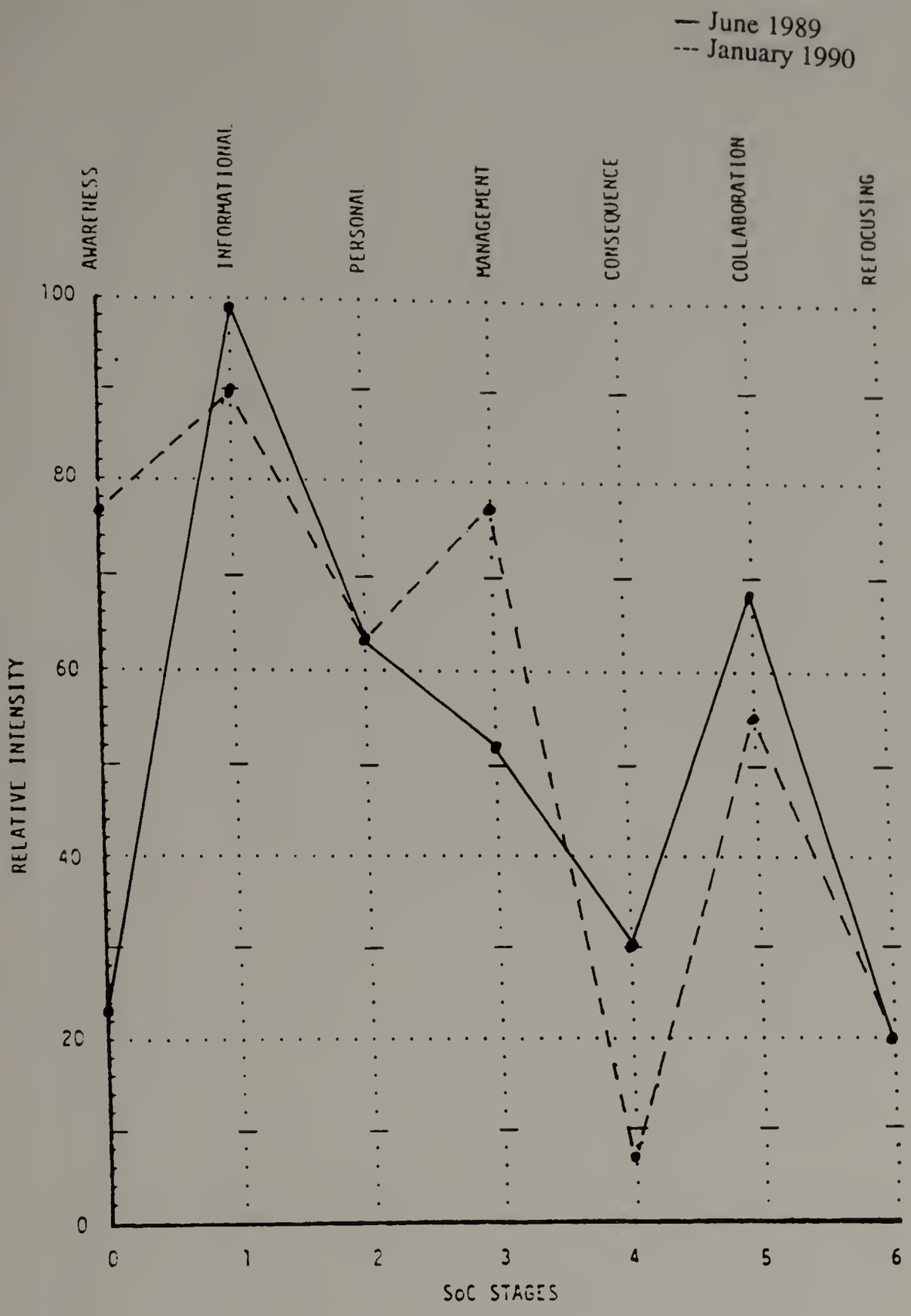


Figure 12. Stages of Concern Profile -- Beth

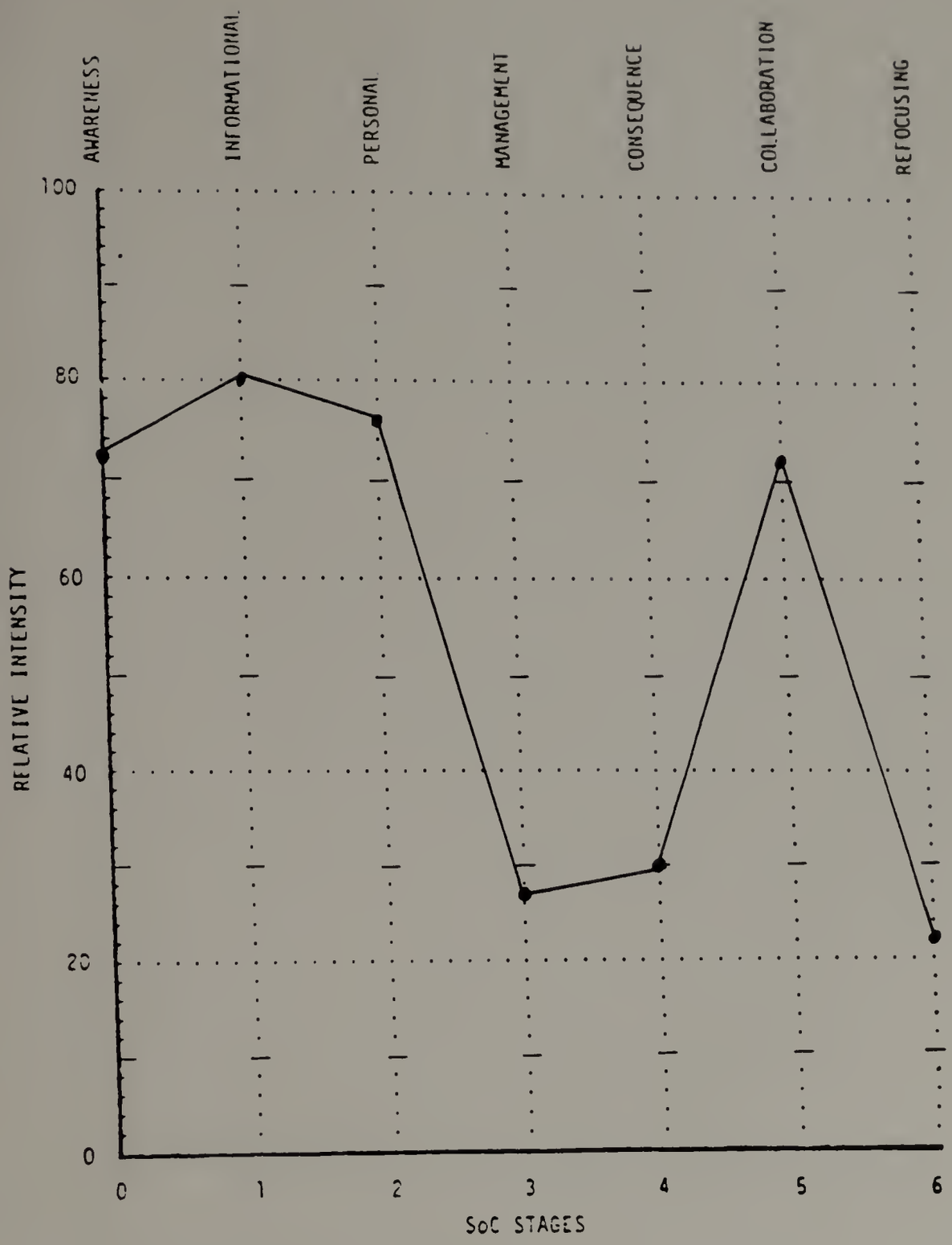


Figure 13. Stages of Concern Profile -- Sally

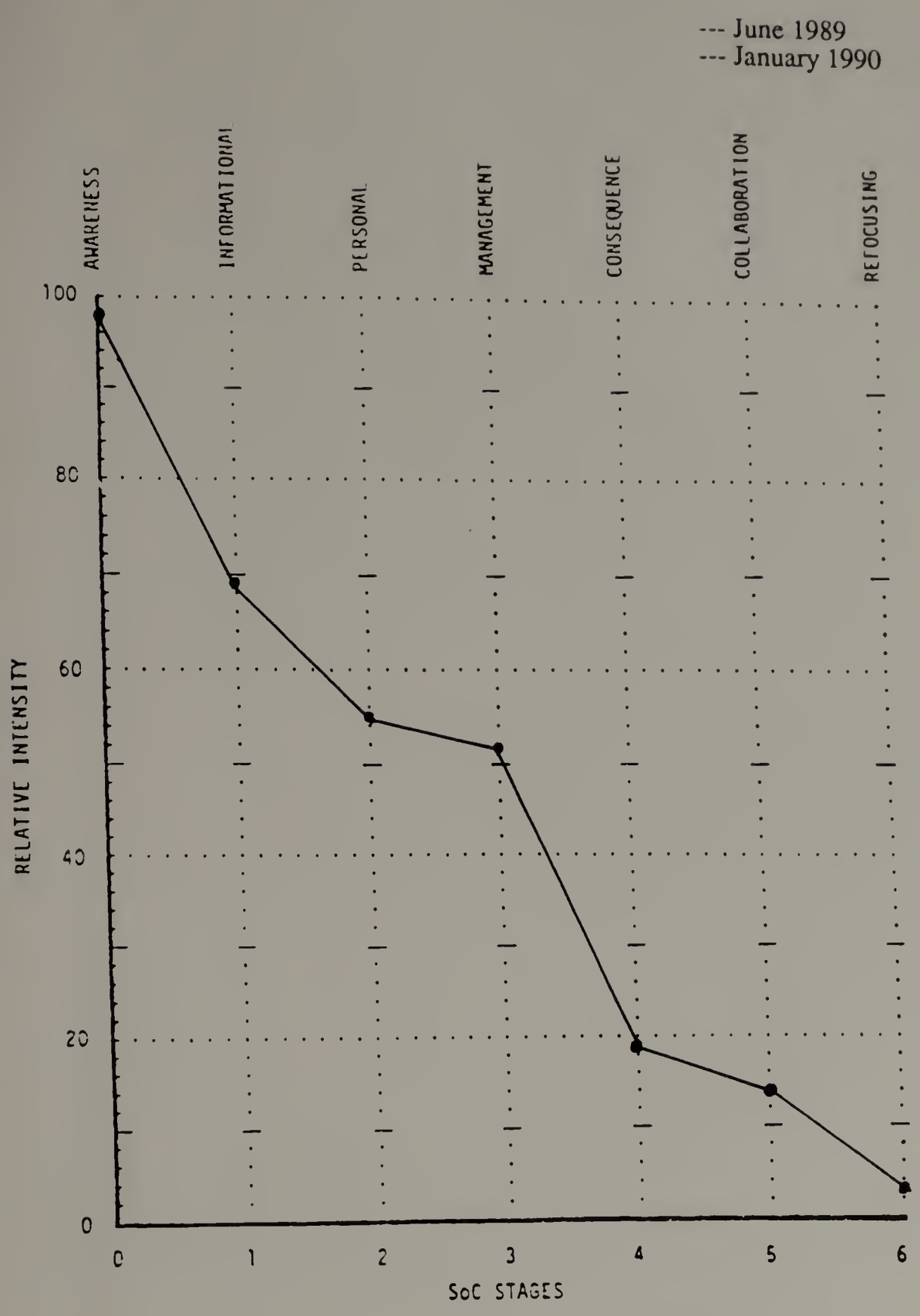


Figure 14. Stages of Concern Profile -- Elaine

Table 5. Level of Use Interview Findings

Level of Use		Number	Teachers
0	Non-Use	1	Elaine
1	Orientation	2	Beth, Milly
2	Preparation	1	Sally
3	Mechanical Use	4	Mary, Linda, Rhoda, Paula
4A	Routine	1	Robert
4B	Refinement		
5	Integration		
6	Renewal		

Scale Point Definitions of the Levels of Use of an Innovation[1]

[according to Hall et al., 1975, p. 54]

LEVEl 0: NON-USE:
State in which the user has little or no knowledge of the innovation, no involvement with the innovation, and is doing nothing toward becoming involved.

LEVEL 1: ORIENTATION:
State in which the user has acquired or is acquiring information about the innovation and/or has explored or is exploring its value orientation and its demands upon user and user system.

LEVEL 2: PREPARATION:
State in which the user is preparing for first use of the innovation.

LEVEL 3: MECHANICAL USE:
State in which the user focuses most effort on the short-term, day-to-day use of the innovation with little time for reflection. Changes in use are made more to meet user needs than client needs. The user is primarily engaged in a stepwise attempt to master the tasks required to use the innovation often resulting in disjointed and superficial use.

LEVEL 4A: ROUTINE:
Use of the innovation is stabilized. Few if any changes are being made in ongoing use. Little preparation or thought is being given to improving innovation use or its consequences.

[1] The full scale point definitions and the breakdown of categories will be found in Appendix B.

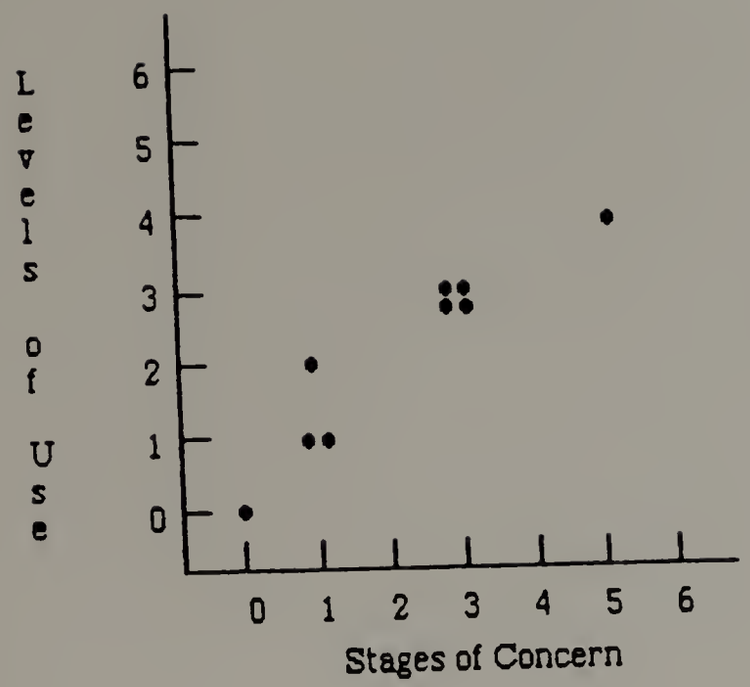


Figure 15. Correlation: Stages of Concern and Levels of Use

Six Month Follow-up Evaluation. In January of 1990 a follow-up evaluation was made of the teachers who were using telecommunications in their classrooms. The teachers completed the Stages of Concern Questionnaire (Appendix B), the Levels of Use Interview (Appendix B), and a Computer Use Questionnaire (Appendix B). In addition the researcher gathered data by means of informal interviews and conversations with these teachers.

The second profile of the teachers on the Stage of Concern Questionnaire (Table 6) and Level of Use Interview completed in January 1990 was similar to the profile of June 1989. This finding is not unusual for a group of teachers who were still in their first cycle of use of an innovation. The majority of teachers were at the same Stage of Concern as they had been six months before: Beth was a nonuser at stage one (Figure 11), Linda and Rhoda were beginning users at stage three (Figure 5 and 6), and Robert was a routine user at stage five (Figure 8). There were two teachers whose Stage of Concern had changed from that of the earlier evaluation.

Table 6. Stage of Concern Percentile Scores at 6 months

Subject	0	1	2	3	4	5	6
Mary	53	60	(63)	15	27	52	20
Linda	93	91	(96)	(97)	27	22	22
Robert	10	57	25	18	21	(97)	69
Beth	77	(90)	63	77	7	55	20
Rhoda	89	80	85	(95)	27	84	52
Paula	(94)	30	5	52	2	9	3

Mary was still a nonuser but had moved from stage one (informational concerns) to stage two (personal concerns). Her profile showed what Hall, et al., [1977] calls a

"negative one/two split": Personal concerns (Stage 2) override concerns about learning more about the innovation (Stage 1). She was much more concerned about her personal position and well-being in relation to the change than she was interested in learning more of a substantive nature about the innovation. Before she can look at this innovation objectively, her personal concerns (Stage 2) will have to be reduced.

While both Sally and Beth were "using telecommunications" in their curriculum, they were actually making use of the technology through the efforts and assistance of a fellow teacher. Their students composed and wrote the material on a disk which another teacher transmitted on the BBS. Even though Sally and Beth were interested in participating in the telecommunications project, they relied on another person for their "hands-on" telecommunications on-line.

Paula had an extremely low total score and appears to be an unconcerned user of telecommunications. On the Stages of Concern Questionnaire her highest concern was Stage 0 where it had been Stage 3 earlier (Figure 7). Her response on the questionnaire suggests the innovation is so far removed from her life space that it has little meaning. As a user of telecommunications, her high at Stage 0 indicates she is more concerned about other things not related to the innovation. This researcher is aware that her class has just become involved in a new innovative project which is taking much of her time and this would explain the finding of the Stage of Concern.

Paula still has management concerns (her second highest peak) and so to her, use of telecommunications has not yet become routine. It remains at Level 3, which is mechanical use. She is primarily engaged in an attempt to master the steps required to use telecommunications, with the organization of time a prime concern--time to get to "the computer" (with modem) which is located in the library of an adjacent building.

Since the data for this evaluation was collected during the first cycle of use of telecommunications, most of the users were at LoU 3 and are not yet using the innovation effectively. This finding supports the research of Hall et al., [1975], who further state that it is only with continued use that management becomes routine and the user moves on to the impact levels (4, 5, & 6), with increased effectiveness for the clients.

Degree of Success in Implementation

The nine participants in the Telecommunications Project met on May 1st at Bartlett School to plan the initial implementation with their classes. Since the end of the school year was so close, it was decided there was not enough time for a complex project before the end of the school year. It was planned that each class would send a general letter of introduction to other classes. This gave the teachers an opportunity to continue to practice their new skills each week by downloading the letters sent to their classes, and they would each only need to send one letter each week.

When classes resumed in the fall, the teachers from the two schools met to plan telecommunication activities. Three of the Bartlett School teachers did not participate in these Fall activities, while all of the teachers from the Apple Hill School were involved. The target group of teachers who had completed the Telecommunications Training Program showed 100% retention and continued implementation, while the teachers who had not gone through the training program showed only 50% retention and continued implementation of telecommunications. The correlation between the Level of Use [Hall, et al, 1975] findings and the continued use of telecommunications was high for this group (Table 7). Of the teachers continuing to use telecommunications in their classrooms at the beginning of the new school year, 83% had achieved a Level 3 Use or higher from their

brief experience at the end of the previous school year. The teachers who had not continued the use of telecommunications in the fall had all been below Level 3 Use as of the end of the previous school year.

Table 7. Level of Use and Implementation

Level of Use		Continuing Users of Telecommunications
0	Non-Use	
1	Orientation	Beth
2	Preparation	
3	Mechanical Use	Mary, Linda, Rhoda, Paula
4A	Routine	Robert
4B	Refinement	
5	Integration	
6	Renewal	

During the summer, the Southern New Hampshire Apple Core users group moved their BBS to a larger computer. As a result of this move, the teachers had to log-on to the new system and become familiar with some new commands. This was not a problem for any of the teachers. They all found the new system to be easier to use than the old system.

Both the fourth and sixth grade teachers decided to integrate telecommunications into their social studies programs, with the sixth grade teachers developing a "Mystery Country" contest, and the fourth grade teachers organizing student activities in sharing "Trivia" questions on local history.

Six Month Follow-up Evaluation

The teachers' implementation of telecommunications in the classroom was reevaluated in January of 1990 by means of observations, interviews, and a Computer Use Questionnaire (Appendix B) designed by this researcher. It was found that:

* 83% of the teachers were using computers more than they did one year ago (Figure 15); and
* 66% of the teachers were on-line users of telecommunications (Figure 16).

Six of the nine original teachers in this study continue to use telecommunications in their curriculum, but two of the teachers at Bartlett School are relying on their fellow-teacher to transmit communications which they have put on a disk. All of the teachers at the Apple Hill School are handling their own telecommunications.

The teachers who had not continued to use telecommunications following the initial implementation phase were also asked to complete a brief questionnaire which would indicate their interest in telecommunications or the lack thereof (Appendix B). Two of the teachers indicated that they were not interested in pursuing the use of telecommunications at the present time. The third teacher was still interested in using telecommunications but said she needed "time and lots of assistance". She also said she would be interested in attending a telecommunications workshop to improve her skills.

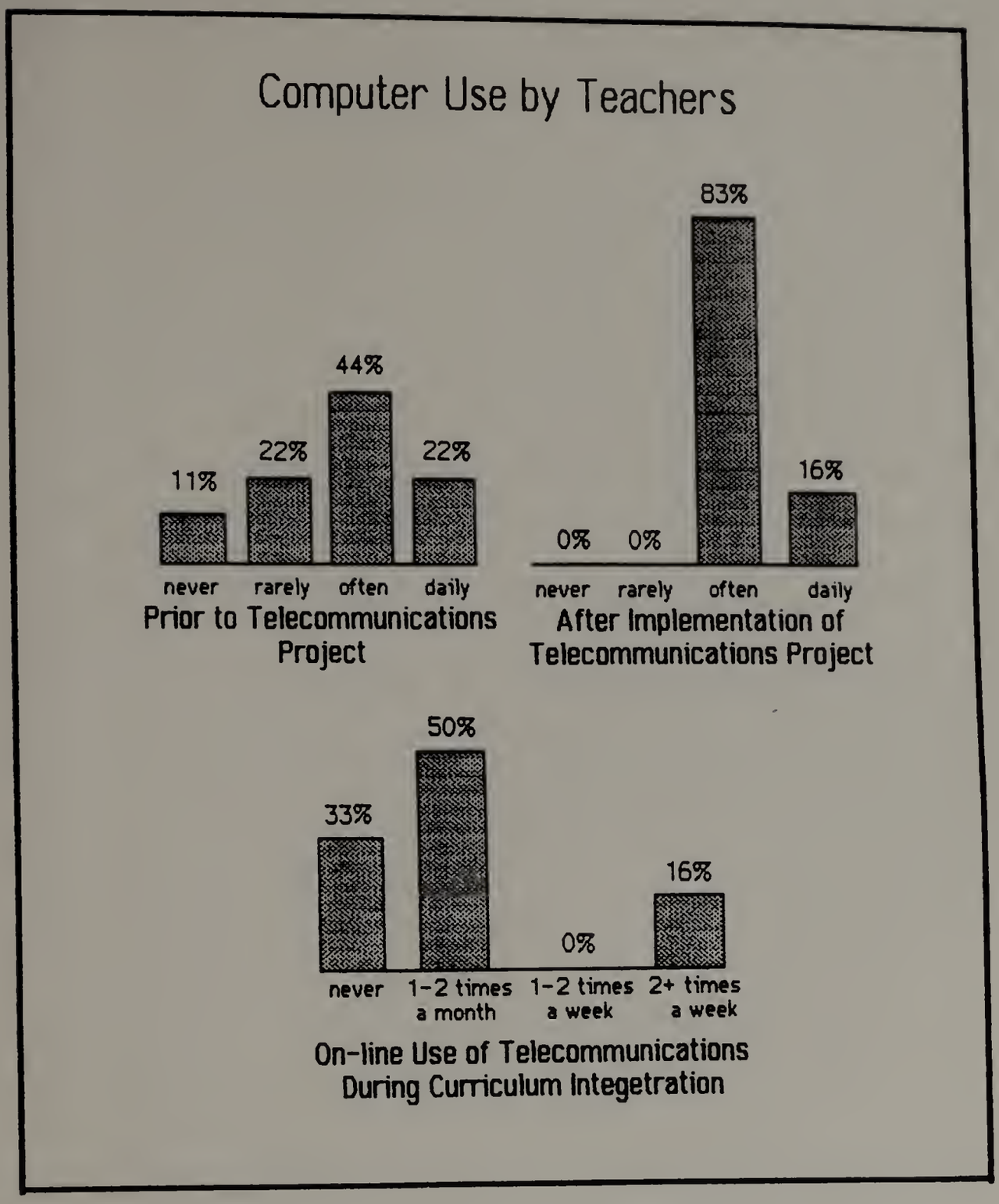


Figure 16 Computer Use by Teachers

Student Learning with Telecommunications

The telecommunicating carried out by students in May and early June was limited to general letters of introduction to all the other classes, with two classes per week being assigned to send their letters. A progressive story was also circulated between the classes, with a different class each week adding to the story. The student learning that took place in the spring consisted primarily of getting acquainted with the new technology of telecommunications.

Student letter:

FROM -> APPLE HILL DURANT (#154)
DATE -> 05/16/89 07:29:51

HI EVERYONE,

WE'RE WRITING TO YOU FROM OUR CLASS HERE AT APPLE HILL SCHOOL. WE'LL INTRODUCE OURSELVES BY WAY OF TELLING YOU SOME OUR OUR ACTIVITIES, PASTIMES, ETC.

WE HAVE 23 PUPILS IN OUR CLASS--11 BIRLS AND 12 BOYS. SOME OF OUR CLASSMATES COME FROM OTHER COUNTRIES--INDIA, THAILAND, PUERTO RICO, AND THE DOMINICAN REPUBLIC.

OUR CLASS IS IN ONE OF THE PORTABLE CLASSROOMS AT APPLE HILL. IT IS DIFFERENT BEING OUT HERE, BUT WE'VE COME TO ENJOY IT.

THERE ARE THREE LUNCH PERIODS. WE HAVE FIRST LUNCH--THAT MAKES A LONG-G-G-G AFTERNOON! AT RECESS TIME, WE DO DIFFERENT ACTIVITIES--PLAY SOCCER, VOLLEYBALL, JUST CHAT WITH OUT FRIENDS, ETC.

AFTER SCHOOL, A FEW BABYSIT, A FEW OTHERS PLAY VIDEO-GAMES, WATCH TV, AND SOME OF US GO TO THE BOYS' CLUB. UNFORTUNATELY, MOST OF US AT SOME TIME, DO HOMEWORK.

MANY STUDENTS IN OUR CLASS HAVE PETS AT HOME. SOME TYPES OF PETS WE HAVE ARE: DOGS, CATS, BIRDS, GERBILS, RABBITS, AND FISH. THOUGH OUR PETS ARE DIFFERENT, WE ARE ALL GLAD TO HAVE THEM AS OUR FAITHFUL FRIENDS'S.

LAST WEEK OUR CLASS WENT ON A FIELD TRIP TO ODIEORNE POINT. IT WAS ON A VERY WINDY, COLD, AND RAINY DAY. WE WERE WET

AND FROZEN. WE ALL HAD A TERRIFIC TIME. WE SEARCHED SOME ROCY AREAS AND FOUND MANY SMALL ANIMALS AND PLANTS. IT WAS VERY INTERESTING! WE HAVE ANOTHER TRIP IN JUNE. WE ARE GOING TO THE MOUNTAINS. IT WOULD BE REALLY NICE TO HAVE 'SUNSHINE' ON THIS TRIP.

OUR CLASS TOOK PART IN 'THE GREAT MAIL RACE' THIS YEAR. WE HAVE NOT RECEIVED MANY RESPONSES. WE ONLY RECEIVED LETTERS FROM ABOUT 1/5 OF THE U.S. HOPEFULLY, WE'LL RECEIVE A FEW MORE BEFORE SCHOOL IS OUT IN JUNE.

WE ARE ANXIOUS TO HEAR (READ) NEWS FROM YOU ABOUT YOUR GROUPS AND YOUR ACTIVITIES AND SCHOOLS. SO

WE'LL BE WAITING!

Student story:

This is an adventure story. We couldn't decide on a title because we didn't know where the story was going or what the finished story would be about. We had some ideas for a title and maybe you will have some other ideas.

Choose a title:

Adventures of a Summer Vacation
Adventures in Ethiopia
Monkey Business
The Wacky Vacation

STORY:

Ian and his sister, Samantha were going off to Africa for summer vacation. They were taking their pet monkey, Joe. When they arrived in Addis Ababa in the country of Ethiopia they were greeted by an elephant.

THE ELEPHANT SEEMED TO HAVE MAGICAL POWERS. SEATED ON THE ELEPHANT WAS A TALL SKINNY FIGURE. SAMANTH WENT AND TOUCHED THE ELEPHANT. SUDDENLY, ALL THE DIAMONDS ON THE FIGURE LIT UP.

The elephant shed his skin, it fell to the ground and turned into a magic carpet. His ivory tusks turned into airplane wings. The tall, skinny figure turned into a robot with the lighted diamonds for his eyes.

In the Fall, with a new group of students, telecommunications was integrated into the social studies curriculum at both the fourth and sixth grade levels. The students in the sixth grade classes at each school worked together to compile the data for the Mystery Country Contest; a sample of which follows. The Mystery Country was limited to the countries of the Western Hemisphere which are a part of the sixth grade curriculum. The Mystery Country data sheet was then sent to the teachers at the other school. The students at the receiving school were able to select whether they wanted a 1 point or a 5 point clue and they were allowed three clues per day.

The fourth grade classes used their Nashua History text to make up five questions which would be sent to the other participating fourth grade classes. The answers were sent a week later, similar to a newspaper crossword puzzle. This allowed students to participate in the telecommunications on-line without giving away the answers.

At both levels the students were working cooperatively to select questions and clues which would be sent to the other classes. As they discussed these questions and clues and made their decisions, they were reviewing their social studies lessons. They became aware of fellow students across town who were learning the same things.

The informal feedback to this researcher indicated that the sixth grade teachers were very enthusiastic over the success of the "Mystery Country Contest". They felt that the students were learning much more about each country as a result of their research than they would have without this project. The students also enjoyed sharing their learning with students across town. The fourth grade students were challenged to learn new ways of learning when one class went beyond the limits of the text book in asking "Trivia" questions. The students discovered they could get answers by calling the local "Dial-A-

Teacher" in the evening, the local library, and the City Clerk's office. The students were learning how to learn and enjoying the process.

From:Bartlett Goode #177 Sent at 7:38:46 AM on 10/13/89
Subject:GRADE 6 - MYSTERY COUNTRY - FIRST COUNTRY

1 Point Clues

1. I look around, I see.....mountains.
2. The weather is.....hot, cold, and dry.
3. I see an animal. It is.....an anteater.
4. That landmark over there is.....a ruined Aztec temple.
5. People around me are.....farmers trading their goods.
6. People are eating.....flattened pancakes.
7. Folks are dressed in.....brightly colored clothes.
8. The unusual thing over there is.....their festivals.

5 Point Clues

1. It is on the continent.....North America.
2. The longitude is.....100 degrees West.
3. The latitude is.....20 degrees North.
4. A city is.....Durango.
5. A bordering country is.....Belize.
6. A bordering body of water is.....Pacific Ocean.
7. A "Mystery Clue" is.....They have sisal.

The "Mystery Country" is.....Mexico.

This country was identified with _____ points.

Week # 1 Nashua Trivia Questions

From:Apple Hill Gordon #195 Sent at 6:15:10 AM on 10/16/89

1. Where in Nashua can you find a collection of Indian arrowheads and tools, today?

2. What is the meaning of "Nashua"?

3. Who were the leaders (2) of the first group of explorers who came to this area?

4. What is a "Charter"?

5. This part of NH was once governed by what Province?

From:Bartlett Rice #22 Sent at 2:05:12 PM on 10/19/89

1. How many people live in Nashua?

2. Who was the first mayor?

3. What year did the first president come to Nashua?

4. How many presidents came to Nashua?

5. Where was the first house built in Nashua?

Six Month Follow-up Evaluation

Looking at what had been accomplished with the students following six months' use of telecommunications in the classroom, it was found that:

* Students who never or rarely used computers a year ago are now using them often;
* 83% of the students know what a modem is; and
* 17% of the students have had "hands-on" experience with telecommunications.

In addition, the use of computers for lower level cognitive skills, i.e., drill and practice and games, decreased. Significantly, the higher level cognitive skill use, i.e., word processing and telecommunications, increased (Figure 17). The growth in the use of word processing has also brought about an increase in the teaching of keyboarding.

The teachers reiterated that the students at the sixth grade level had developed better research skills because the telecommunications project had motivated them to do a more thorough search. Even in a class with a lower level of ability and many ESL students, telecommunications motivated the students in their studies.

> "The Mystery Country telecommunications were enhancing to the social studies curriculum and motiviating to my students."
>
> "My students became quite good in their research skills. They were eagerly digging a little deeper."
>
> "This class has a much better grasp and understanding of longitude and latitude because they had a reason for learning it in locating the Mystery Country."

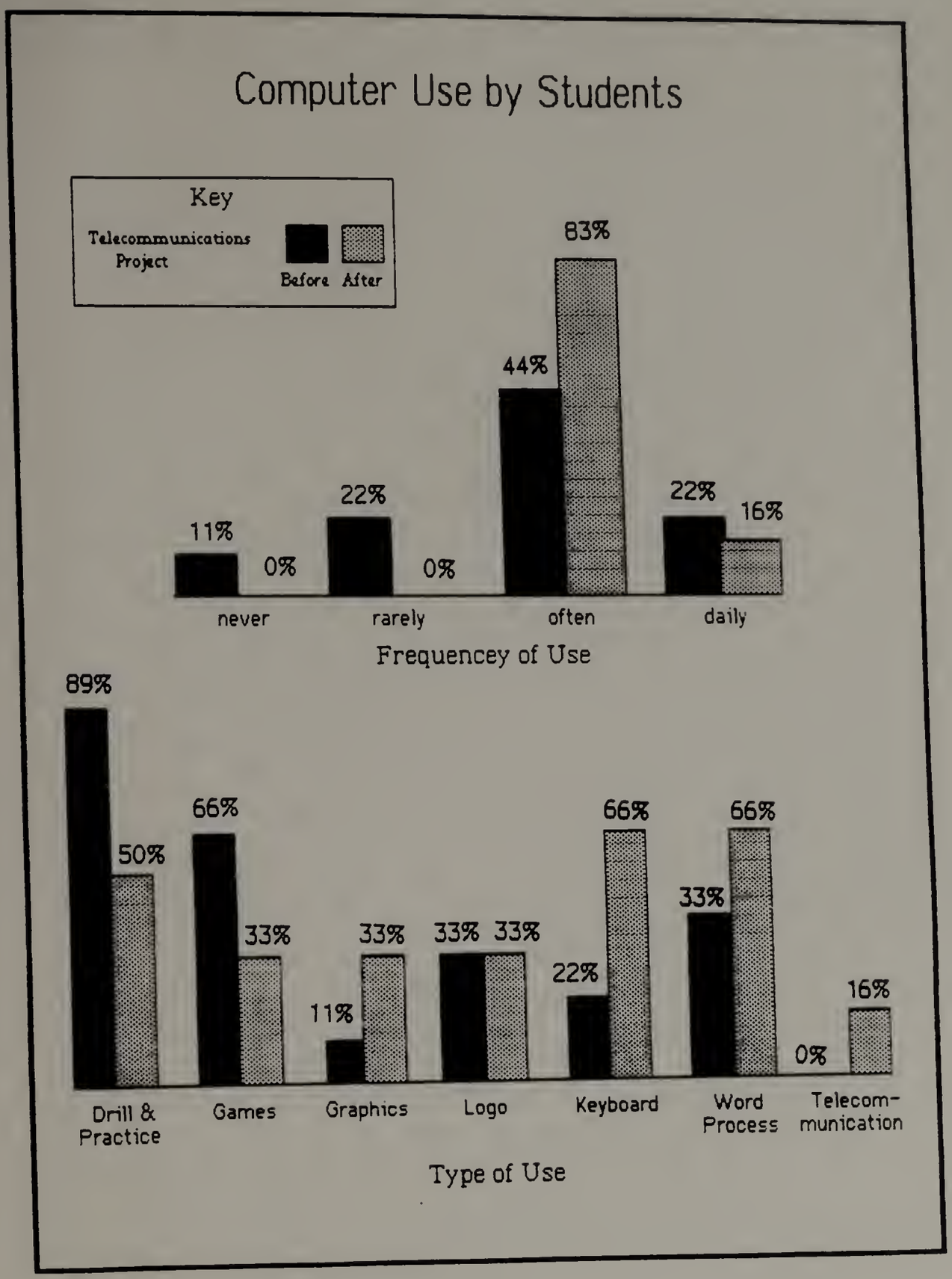


Figure 17. Computer Use by Students

At the fourth grade level, the teachers felt that sharing in the learning process with other classes had opened their students to a bigger world than just their isolated classroom. It was also found that there was more cooperative learning taking place and the students were learning new ways of learning outside the confines of their classroom and textbooks.

> "The kids feel like they're not alone in learning this stuff anymore. They have a new awareness of the classes across town doing the same things they are doing. It has made their world bigger."

> "I had more students searching for answers outside of the classroom and school. They called the City Clerks Office, the library, and Dial-a-Teacher. Their ways of learning expanded."

> "At this grade level, where many students have a difficult time graspping the concepts of city and state, it has helped them to know other students in their own city who share a common experience."

> "The students are curious about the other classes asking: "Where did these questions come from? Who made them up?'"

Support Structures and Barriers to Implementation

Prior to the study, the teachers' perceptions of support within their school environments for implementing an innovation were analyzed. This data was gathered in the Computer Backround Questionnaire (Appendix B). During the interviews following the study, they considered the problems faced in implementing telecommunications in this study, and barriers to likely success in the future.

School Support Structures Present

The majority of the teachers at both schools described their school climate as supportive for their development as educators. The principal was considered by most of the teachers to be supportive of new ideas, and they indicated there had been previous alterations in school procedures to support innovations.

In rating their colleagues' interest in investigating curriculum innovations related to computers, there was a wide range indicated by these teachers. The teachers from the Apple Hill School unanimously agreed that their colleagues' interest and involvement in this area was neutral. The teachers from the Bartlett School were split in their appraisal. One-third indicated their colleagues were uninterested in computer innovations, while two-thirds said they were interested.

The Bartlett School has been provided financial support by the Parent Teachers Organization to purchase computers, and it also was a part of the Governor's Initiative which provided each teacher in the school with a computer to be used at home. There has been a great deal of support for computer innovation in that school. The Apple Hill School, on the other hand, has not had this kind of support, and the small number of computers at that school is a limiting factor in promoting teacher interest.

School Support During the Study

Each of the schools in this study has a classroom teacher who serves as the building computer coordinator. These lead teachers, who provided the telecommunications inservice training, had each completed a college course in telecommunications and were on-call in their buildings to assist the teachers in this study.

At the conclusion of the study, the teachers at Apple Hill School reported having developed an informal peer support group. These teachers usually worked in pairs when telecommunicating, providing coaching for each other. The teachers at Bartlett School did not receive this type of support from their colleagues. It is the researcher's feeling that the telecommunications environment at Bartlett School (a classroom always full of students), coupled with the lack of group training, may have contributed to the dearth of mutual

support within the group. It may be pertinent to note that the teachers in the target group from Apple Hill School who perceived some measure of collegial support were all rated by the researcher, based on the data collected from the logs of on-line use and the Level of Use Interviews, to be among the more effective implementers of telecommunications. By contrast, only one third of the teachers from Bartlett School were considered to be effective implementers.

Teacher Concerns

The most common concern (voiced by 67% of the teachers during their interviews) was a need for time to practice. Telecommunications is more complex than other educational uses of the computer and these teachers realized they needed more practice in order to feel comfortable using this technology. The teachers' concern with the need to practice newly learned skills of telecommunications is demonstrated by of two teachers taking computers and modems home for the summer.

There were three other concerns expressed by the teachers: limited equipment, limited access to the equipment, and the location of the equipment. All of these impacted on the concern about insufficient practice. The problems of access and location of the equipment were expressed by teachers at Bartlett School.

> "It's hard to get on-line time because the equipment is located in another classroom."
>
> "It makes a difference when...you don't have access to it all the time."
>
> "Maybe I could learn how to use it if I had better access to it--if it were more available--centrally located."

Although the lead teacher in Bartlett School, in whose classroom the equipment was located, urged the teachers to come in at any time to work on the telecommunications project, most of the teachers felt uncomfortable working in the room when class was in session.

> "I don't think we should be in there with his class there because he's supposed to be teaching."

This researcher has the feeling that the teachers were also feeling intimidated by twenty-five students watching while they tried to learn new telecommunication skills.

At the Apple Hill School the phone line for the modem was only available in a small computer lab during the training program and initial implementation. The teachers could go there to work during the school day when there were no students present. However, these teachers felt limited by the fact that they couldn't prepare files in their classroom or at home due to lack of equipment. They had to go to the computer lab to write a word processing file, as well as to send it via telecommunications.

> "The process is time consuming, especially with our lack of equipment."

With the beginning of a new school year and the implementation of telecommunications in the curriculum, the computers were moved out of the lab at the Apple Hill School and located in classrooms. Each participating teacher in this project at Apple Hill School had a computer assigned to her classroom. However, the only computer with telecommunications capabilities, even though it was allocated to one of the classrooms, ended up staying in the library most of the time. This is where the telecommunications phone line was located. It could easily have been moved back and forth from the classroom to the library as needed, but this didn't happen often. Having a

computer in their classroom did not completely eliminate the concerns over lack of equipment. Two of the teachers indicated:

"It would be so much easier if I had a phone line and modem in my classroom".

Trainer Support.

The support provided by the trainer at Apple Hill School in the form of coaching during the implementation of telecommunications was considered crucial to the success of these inexperienced teachers. The fact that there was always someone available in the building who could help with telecommunication questions or problems gave morale support and courage to these teachers who sometimes felt they were about to do battle with a dragon.

It is also important that teachers be willing and able to accept assistance. One teacher, Milly, at the Bartlett School became discouraged with telecommunications when she wasn't "able to do it on my own" without assistance from the trainer during the initial implementation. It appeared to this researcher that there were two factors working against Milly adopting the use of telecommunications. First, she was a very independent type of person who did not want to ask for help and had high expectations for herself. Milly was actually upset with herself because she couldn't do it alone after only a couple of sessions. Second, she expected telecommunications to be as easy to master as her other experiences with computer use in the past. She gave telecommunications a brief "once over" and expected to be an expert. When it turned out that telecommunications was not "User Friendly," Milly withdrew from further implementation.

Planned Future Use of Telecommunications

While the "Telecommunications Project" has come to an end, having been funded for only one year, telecommunications continue. The teachers are considering different areas of their curriculum in which to integrate this technology, and some are looking beyond the local connection with hopes of setting up communications outside of the city and state.

One teacher has taken the lead by having her students transmit stories they are writing. This sparked other teachers, and they are now planning to compile a collection of stories from all of the classes. Students also started writing letters in response to the stories. Following are samples of these stories and letters.

From:Bartlett Goode #177 Sent at 11:20:46 AM on 2/22/90
Subject:Our First Story

The Case of Dave Pave

Dave Pave got into his car and drove to Rick`s Saloon. He went in for a meeting and he got a few drinks. After the meeting was over he came out of Rick'sSaloon and saw a man with all black clothes on, he also had a hat covering his head and his face. The thing that scared Dave the most was the gun that the person had. Dave decided to ignore the person and he walked to his car. He started his car and he opened the window to get some air, and he heard a click. He turned and saw a gun right in his face.The person said, "Don't move" and he went around the car andgot in the passengers side and said, "Drive me to Cambeles Warehouse." He drove there and the person took Dave and brought him in the warehouse. Dave didn't know what was going to happen so he just did what the person told him to do. He went into a dark room, and the person shot him in the head two times. Dave Pave remained here for a week till the workers discovered him. They immediately called the police. The Police and an ambulance rushed over to the warehouse and brought him to the hospital. They took the bullet out of his head and took a ballistics test. They discovered that the bullet matched a gun that could have belonged to one of three people. The FBI went to every gun shop within London. They still had no idea who the gun belonged to. The FBI went to Ricky's Saloon and asked people that worked there who saw or heard anything strange on Saturday night aboute waitresses Tracy and Stacey said, "We saw the person go into a gray car

with no license plates and he drove away very fast." From that clue the FBI determined who it was but the person had suddenly disappeared.

THE END!!

Done By: Mark, Donald, Libby, Loren, Jack, Cheri

From: APPLE HILL Eldridge # 130 Sent at 7:24:25 AM on 2/15/90
Subject: Response

February 23, 1990

Dear Story Writer,
I liked the story, "Married Monday." But you didn't put your name on it. I like the part when the man got executed. It had a lot of imagination in it. I will write a story so that your teacher will read it to your class.

Yours truly,
Ally

From: APPLE HILL Brown # 43 Sent at 3:19:39 PM on 2/17/90
Subject: Critique

Amherst St. School

Dear Bartlett School 6 grade:

The story I read was The Kidnapped Kid. I liked your story because it was interesting, but it would be more interesting with more details. Why did Mike kidnap him? Who did he kidnap, when and where did it happen? I would like know more about Mike and why he kidnapped him.

Sincerely,
Mark

In response to the Computer Use Questionnaire (Appendix B), the teachers indicated they would like to:

* be able to call long distance;
* use a service such as CompuServe;
* have a phone line in their classroom; and
* communicate with other schools in New Hampshire or across the country.

Barriers to Implementation

When the fourth grade teachers decided to implement telecommunications in the social studies curriculum, they planned that the Trivia Project would run for six weeks. One of the teachers was slow in transmitting Trivia questions, causing the Project to get drawn out to thirteen weeks. This resulted in some of the teachers telecommunicating only once or twice a month. The sixth grade teachers had a similar experience. As a result, the teachers did not develop the confidence with their telecommunication skills which would have come with more frequent use of this technology.

The possibility that the school district may not continue to pay the monthly phone bill of $59. per school for the telecommunications lines next year could be a real barrier to the continued use of this technology. The Project funding paid for that phone line for one year, and it is hoped that the district will continue to provide it.

A barrier to the implementation of a telecommunications project such as this at another location could be the lack of a resource person to provide the coaching support that was an important part of this project design. A support person on-call in the building to aid the teachers would be required to duplicate the model in this study.

CHAPTER VI

SUMMARY, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

Summary

This study of inservice teacher training and implementation strategies in telecommunications was undertaken because this researcher believed that much could be learned by observing the development of teachers who had no experience with this technology as they went through the process of acquiring and using these new skills. This researcher hoped to identify a process which was successful in training teachers to use telecommunications and, even more important, provided carryover to the classroom and continued use with students.

Problem

The purpose of the study was to describe the use of inservice content materials and strategies designed to help teachers introduce telecommunications into the elementary classroom. Initially, teachers who were inexperienced in computer education developed skills in the use of telecommunications. Later, the teachers were assisted in implementing telecommunications in their curriculum for use with their students.

The study involved three distinct phases:

* curriculum development;
* skills development; and
* implementation.

Due to the newness of the innovation, the trainer had to develop appropriate telecommunications content for the initial training program. This included the presentation of the theory and principles that govern the use of telecommunications in the elementary classroom.

Methodology

The formal research study design was a multi-site, multi-method study [Patton, 1980] in which the researcher participated as inservice trainer. Triangulation of the data was achieved through the use of observations, teachers' logs, questionnaires, on-line data collection, and interviews. The strategies adopted were a variation of the system advocated by Joyce and Showers [1982] involving cycles of demonstrations, practice, discussion, feedback, and coaching. The coaching strategies adopted during the implementation phase involved observation and coaching by the trainer of participants while they practiced using new skills. There was also peer coaching between colleagues.

Results

Nine teachers of grades four and six from two elementary schools participated in the study. It became evident, as the study evolved, that the teachers at one of the schools were not following the inservice training model as designed by this researcher. Therefore they could not be included in that phase of the study, thus limiting the findings on the inservice training. They were included in the telecommunications implementation phase and served as a comparison to the teachers who had completed the training model.

Conclusions

The findings are grouped according to the initial objectives which focused upon the skills acquired during the training phase, later to focus upon the transfer of these newly learnt skills to the classroom environments. The student outcomes which resulted from this implementation, as well as the training program strategies, and limitations of this study are discussed here.

Skill Acquisition

Elementary teachers who were inexperienced in all facets of computer education were able to successfully acquire limited skills in telecommunications as a result of a short series of inservice workshops. The current study's findings confirm the belief that, irrespective of previous computer education knowledge, such new learning using computers and telecommunications is possible providing the appropriate training is provided. This finding emphasizes the effectiveness of training programs which strive to jointly develop skills and implementation techniques.

A group of teachers who participated in the same project but did not experience the model inservice training program did not acquire the necessary skills in telecommunications, even though they initially had greater computer experience and skills. The demonstrated lack of enthusiasm by these teachers, and the lack of progress in implementing telecommunications (and its inherent learning) by their students, dramatically demonstrated the need for attendance minimally at a short term training workshop. It also shows that people with previous computer experience and greater skills in using computers do not necessarily make successful telecommunication teachers.

In addition, the researcher observed two other variables which impacted upon the skill development in this latter group of teachers. The first was a lack of commitment to the project on the part of these teachers. They did not set aside time in their schedules for learning telecommunications. Second, the location of the telecommunications computer in the classroom of the lead teacher was not conducive to teachers developing telecommunications skills.

Curriculum Implementation

Both Rogers [1986] and Moursund [1989] have made the point that participation in training programs and the acquisition of computer and telecommunications skills by teachers do not necessarily carry over to implementation in the classroom by those teachers. It has been pointed out that many teachers have completed training in telecommunications and never implemented the technology in their classrooms. The focus of this study was to explore ways to overcome this problem.

Given an extensive system of support during the implementation phase, newly developed skills in telecommunications were effectively transferred to teachers' classrooms. The teachers were able to implement the integration of telecommunications into their curriculum with appropriate student activities. This finding suggests that the development of knowledge and skills in telecommunications, and the possibility of integrating the technology into the curriculum, would be fostered by inservice programs such as utilized in this study. In such programs a limited range of telecommunication skills would be developed and immediately implemented, with the teachers receiving support in their school.

There were two teachers who made use of telecommunications and implemented the telecommunications project in their classroom without personally transmitting messages on the BBS. They had not completed the training program and had not developed usable telecommunications skills. They, in fact, depended upon a colleague to do the actual telecommunicating. Thus the question arises as to the feasibility of such a cooperative venture being possible which does not require all teachers having telecommunication skills. This was not the intent of this project, but it is worth further consideration.

It would seem that a computer specialist might be in a better position to undertake this kind of service to classroom teachers than would another overburdened teacher. The advantage of having a specialist handling the telecommunications would be the possible increase of use in curriculum areas by teachers who are intimidated by the technology and would not otherwise make use of it . A specialist, presumably working in a computer lab with the equipment readily accessible, would find it easier to telecommunicate than a teacher who must arrange a time in a hectic schedule to get to the equipment (not in his/her classroom) to send and receive messages. As a result, the flow of messages might be more regular than was the case in the present study. On the other hand, an overburdened computer specialist, or one that was not interested in telecommunications, might put this task on the back burner and thus slow down the flow of messages. There is also a personality issue that enters the picture here: the teacher who is willing and capable of telecommunicating may want the freedom and independence to carry on without having to go through another person. Thus a teacher should have access to telecommunications even if there is a specialist available to take over the task.

When the fourth grade teachers decided to implement telecommunications in the social studies curriculum, they planned that the Trivia Project would run for six weeks.

One of the teachers was slow in transmitting Trivia questions which caused the project to get drawn out to thirteen weeks. This resulted in some of the teachers telecommunicating only once or twice a month. It is this researcher's belief that telecommunications requires regular and intensive use to develop and maintain skill levels and also to keep the telecommunications project vital to the participants. As discussed later in this Chapter, the need for a commitment from the teachers to telecommunicate regularly and on schedule (in certain instances) should be a top priority of any telecommunications project.

Student Outcomes

Student outcomes were incidental to the main thrust of this study, which was the training of teachers. All of the students were learning cooperatively with students located across the city in another school. The integration of telecommunications into the social studies curriculum served to motivate students and resulted in the development of improved research skills. The students were learning how to learn by making use of resources in the community when they could not locate an answer in the school.

Although only 17% of the students experienced "hands-on" use of on-line telecommunications by the end of this study, all of the students were aware of telecommunications and familiar with a modem. The students prepared the files for transmission and saved them on a disk. As a result, their use of computers in the areas of word processing and learning of keyboarding skills increased.

Most of the teachers were not yet comfortable enough with their own telecommunication skills to instruct students in the use of this technology. However, each of the teachers expressed an interest in the students having this experience, and they hoped to move in that direction as they gained personal competence with telecommunications.

Strategies for Training Programs

The inclusion of curriculum implementation of telecommunications as an integral part of the training program was effective in promoting the use of this innovation. This finding emphasizes the effectiveness of training programs which strive to jointly develop skills and implementation techniques.

The benefits of support strategies during the implementation phase is evidenced by the effectiveness of the implementation practice in the teachers' classrooms. The teachers believed that support was essential in facilitating their use of this innovation. Of particular importance was the on-site availability of the trainer/consultant during implementation trials. These findings suggest the need for ongoing support systems to help teachers introduce use of telecommunications into their classrooms and instruction. The value of implementation support to help overcome initial skill deficiencies and/or build confidence is worth further consideration. Teachers new to telecommunications need time and practice to develop their skills more fully and to build confidence in using this innovation. Without this period of coaching and support at their schools to assist in implementation, many teachers never implement telecommunications following a training program.

Limitations of the Study

The nine teachers in this study varied in teaching experience and computer education knowledge, although the majority were relatively inexperienced in computer education by most standard criteria. With the exception of the trainer at Bartlett School, they were not computer education leaders or consultants. The application of the findings of this study to larger groups of teachers, particularly those involving emerging leaders in

computer education, from many schools and/or districts, needs to be carried out with caution.

It is recognized that the sample was small and was not randomly selected . There were significant variations in teaching responsibilities and needs among the teachers, which partially accounted for three of the teachers not continuing with the social studies implementation phase.

This study had two training programs and trainers, one at each school. The initial plans were for the Model Training Program designed by this researcher to be used at both schools. There appear to be a number of reasons that the plans were not followed at the Bartlett School:

* lack of commitment by the teachers
* personality interactions within that faculty
* the trainer's conviction that Bartlett teachers had little interest in computers

As a result, the Training Program had a mixed effectiveness, as not all the teachers participated in the designed model. This limited the findings on the training to a small target sample. Thus, further study with a larger sample would be indicated.

This study did not include an experimental control design. The conclusion that can be fairly stated for this study is that the coaching strategy which was utilized as a part of the Training Model assisted this group of teachers in effectively implementing telecommunications. The applicability of this finding to other cases where the trainer changes the combination and emphases of the support system must again be made with caution.

Implications of the Findings

This study has shown that teachers with little computer experience can be trained to use telecommunications in their curriculum provided they are given adequate training and coaching. Successful implementation of telecommunications demands a training program which provides support and coaching during the initial implementation phase. Teachers who are new to telecommunications can succeed in implementing this complex technology when they have a support person who is on call to provide coaching.

The outcome of this study further shows that previous computer experience and a high level of skill in using computers do not insure a successful telecommunications teacher. There were two examples in this study which indicate this. The first was the trainer who had completed a college course in telecommunications but had not implemented it in his classroom or even used it personally over a span of three years. The second example was the group of teachers from Bartlett School who each had a computer at home and much more experience and computer training than did the teachers at Apple Hill. However, this was not enough to make them successful in using telecommunicationS. Before considering telecommunications as a possible technology to use in the classroom, one needs to make sure that there is a strong commitment by the teachers. Going back to the five guiding principles for using telecommunications which were given in Chapter 1 (p. 5), this researcher would consider the fourth to be the most important and the one to consider first when deciding to undertake a telecommunications project.

> 4. The teachers involved must share a strong commitment, both to the lesson to be taught and to the use of telecommunications as the means of sharing data in a timely manner.

Telecommunications projects require regular and intensive use within the confines of a normal curriculum study time period. That is to say that telecommunications should not be drawn out over lengthy periods of time. Their effectiveness is greatest when use is short in duration, but intensive, especially at the elementary level. It is neither necessary nor desirable to use telecommunications in the curriculum all of the time, year round. In order for telecommunications to succeed, it requires a commitment from participants to regularly use the message system during the time frame of a project.

In practice, a commitment to use telecommunications in the curriculum usually requires the transmission of messages or data at least once or twice a week. Quite often there may be deadlines to meet, such as (in the case of the Kids Network) transmitting rain data by a certain date, or the fourth grade in this study sending a new set of questions every Friday. If messages or data are sent on Friday, you usually have to log-on again Monday to pickup the messages or data from the other classes or schools in the project. If yours was the last transmission Friday and you were able to pick-up everyone else's messages or data at that time you may save some online time. When deadlines are not met the other classes are left without data to work with, and it can destroy a lesson for the other classes. It is critical that teachers and students recognize the mutuality of their commitment and its importance.

While teachers might like to have a phone line and modem in each classrooms, the cost would be prohibitive in most schools. The telecommunications computer and phone line need to be centrally located and equally accessible to all teachers. A good location for this would be in a media center or computer lab. The equipment should be in place and ready for use, since moving equipment into place in order to use it requires to much of a teachers' valuable time and discourages them from using it.

At the present time telecommunications is seen as being complex and not especially "user friendly." Several people have said that it needs to be made less complex for the average user. The Kids Network software is very user friendly. All "techno-trivia" and passwords are handled by the software and are invisible to the user. To use that system all one needs to do is click on the large red phone icon on the main screen to be connected to the "Hub" computer. Perhaps the development of a nationwide school network, which uses software similar to that of Kids Network, would be of great benefit to teachers using telecommunications. It would be a system where the user does not need to go through numerous steps and jockey between the terminal and the computer with which it is connecting to get online and send messages.

Recommendations for Future Research

A study is needed which builds on the present research, using the coaching strategy in implementing telecommunications, with a larger sample of teachers over a longer period of time. This study provides a starting point for those interested in investigating the implementation support strategy as a means of continuing the development of newly acquired skills and insuring the implementation of this technology in the classroom. The coaching provided during the implementation phase in the present study included peer coaching as well as that done by the trainer. The teachers reported having learned a great deal from their peers. Another study might develop this concept further to the point that the coaching is provided by more experienced teachers rather than the trainer, thus developing a growing cadre of teachers who can provide coaching in telecommunications.

The feasibility of a computer specialist or other interested teacher assisting colleagues by transmitting messages for them is worthy of investigation. Such a cooperative venture would not require all teachers to have telecommunication skills or instant access to the equipment. A question might be asked as to whether it is too much to expect all teachers to have such computer skills. On the other hand all students should have the opportunity to use this technology. A comparative study with a control condition which would explore the use of a specialist versus a "teacher" doing the telecommunicating would be illuminating. In a school which had a computer specialist (or an extremely dedicated teacher), a study might be undertaken of telecommunications use where the specialist was doing the online work for several teachers, while the teachers made use of telecommunications in their curriculum. These results could be compared with another group of teachers who did the telecommunicating on their own. In which situation is the classroom teacher better served? In which situation are the students better served? In which case did more online use take place?

In this study most of the students did not have the opportunity for online use of telecommunications. Further research could look at the requirements for getting students to actively participate in telecommunicating. Again, is it more effective when there is a computer specialist to work with the students, or can classroom teachers be successful in training students to use telecommunications?

At the end of this study, as students started writing stories and letters, they began to critique each other's writing on their own. This is something which most elementary students do not feel free to do with their peers within the confines of their classroom. Does the anonymity which telecommunications provides free students to express themselves

more openly? Further research could look at this question and how telecommunication changes students' writing.

How can one determine (or can one determine) which people will be successful users of telecommunications? Is there a way to predict which teachers will follow up on their commitment and be there for the other classes with messages transmitted on time? It is this researcher's opinion that even a recommendation from the school principal of teachers who turn in reports on time would not be a valid criterion, since the circumstances are so different. What do you look for in selecting teachers to use telecommunications? Are there studies one can make or psychological tests which can answer these questions? Certainly you would look for a person who is responsible, conscientious, and has a keen interest in telecommunications and its possibilities, but how can these characteristics be reliably assessed?

Another interesting question: Why are highly skilled computer users not using telecommunications? As a case in point, consider the number of computer coordinators who have little knowledge or experience with telecommunications. It is this researcher's experience that many teachers studying computer education at the graduate level have expressed a reluctance to use telecommunications. Why are they afraid of telecommunications? For many it is a concern with the cost involved. They see dollar signs going around when they are online For others it's a fear of being lost in never-never land and not being able to escape without dire consequences--perhaps more dollar signs. This does not explain why they do not use local Bulletin Board Systems which are free of charge. Perhaps they are concerned that someone--the Sysop--will see them making mistakes. Yet another reason why these skilled computer teachers are not using telecommunications may be the lack of immediate and continued use following training such as was an integral part of the current study. The training alone does not make one familiar with telecommunica-

tions. A lapse of even two or three weeks in the early stage of adopting telecommunications can mean the end for many.

It might be of use to circulate a questionnaire among teachers and computer coordinators who have tried telecommunications or been trained in its use. The information that could be immediately developed could include:

1. the teachers' reaction to their experience;
2. the success (or non-success) level of their experience;
3. how recently they had learned or been taught telecommunication skills; and
4. the teachers' evaluation of telecommunications as a tool in education.

Finally, why do more men than women use telecommunications? It would appear to this researcher that they do. Looking at the list of members of a local Bulletin Board Systems (ratio 17 to 1), the people who leave messages on CompuServe, persons writing articles on telecommunications in various magazines, and those presenting workshops or teaching telecommunications; they are predominantly male. This is an important question which concerns education when you consider that the majority of teachers are women. Surveys could be conducted online to assist in determining the answer to this question. However, to reach the women who are not online, one would have to poll the membership of state computer coordinator associations and computer user groups.

The results of this exploratory study are encouraging, although much remains to be studied. The efficacy of the training program for introducing complex technology to inexperienced teachers is encouraging, given the demands of a technological society on public education.

APPENDIX A

TRAINING PROGRAM MATERIALS

Telecommunications
Inservice Training
Lesson Plans

Developed by
Carol-Anne Eldridge
February 1989

TELECOMMUNICATIONS INSTRUCTIONS

Teacher Inservice

This inservice training is designed for the teachers who are a part of the innovative telecommunications project funded under the supplementary budget of the Nashua School District. Teachers will be introduced to technical terms, equipment and the use of a local BBS as well as direct connection of two remote computers. The software used for this project is Appleworks for word processing and Apple Access for telecommunications.

OBJECTIVES

At the conclusion of the course, participating teachers will:

1. Be familiar with vocabulary associated with telecommunications.
2. Know the necessary equipment and software needed for telecommunications.
3. Successfully log on to the local BBS and obtain a password for their class.
4. Be able to use electronic bulletin board and electronic mail systems.
5. Prepare text files for "uploading" to an electronic mail system.
6. Be able to "download" E-mail from BBS to disk file and print out.
7. Develop a lesson plan for a particular subject using telecommunications.

TELECOMMUNICATIONS
LESSON PLANS

Inservice Training

LESSON 1 LOGGING ON TO BBS

1. Introduction to telecommunications
   A. Overview of telecommunications in Education
      1. Information services - CompuServe
      2. Networks
         a. Country & world wide
         b. Local
      3. Point to point
         a. Across country
         b. Local
   B. Vocabulary - Handout # 1
   C. Equipment and Software
      (Modem)

2. Demonstration: get class password

3. Sign up SNAC BBS - get password
   Handout # 2

4. Assignment: Using Appleworks, write message to instructor and save it on a disk and bring that disk with you next week.

LESSON 2 UPLOADING TEXT FILES

Handouts:
- #3 "Preparing Files to E-mail"
- #4 "Recording File"
- #5 " Mail"

1. Data disk for telecommunications -
   A. Keep NAME SHORT
   B Format disk using Appleworks
   c. Get message to instructor on desk top.
   d. Print it as a text file on communications disk. (Handout 3 - "Preparing Files to E-mail")

2. Demonstration:
   Log on to BBS and send file

3. Log on to BBS
   A. Start up Apple Access II
   B. Prepare RECORDING FILE
      (Handout #4 "Recording File")
   C. Log on to BBS
      (Handout #2 from previous session)

4. Send mail (uploading text files)
   (Handout #5 "Uploading Mail")

5. Assignment: Practice during the week - log on and send mail to any/all of the teachers on the system. Everybody needs mail waiting for them next week. Suggest working in pairs to help each other out.

LESSON 3 DOWNLOADING TEXT FILES

Handouts:
   #6. "Downloading E-mail"
   #7 "ASCII to Appleworks"

1. DEMONSTRATION
   A. Log on
   B. Record mail

2. DOWNLOADING TEXT FILES
   A. Close Recording File and Open New File
      Handout #4 - "Recording File" from previous session
   B. Log on to BBS
      Handout #2 from 1st week

C.Turn on RECORDING and Read mail
Handout #6
D. Terminate connection
E. Turn off the RECORDING before quitting Access II to make sure your file is saved on disk.

3. GETTING TEXT (ASCII) FILES FROM DISK
   A. Using Appleworks - Handout #7
      1. Make a new file for Word Processor
      2. Make a new file:
         [2. From text (ASCII) file]
      3. Give Pathname
         (Pathname consists of disk name + name of recording file you're trying to bring upon desk top)
         SAMPLE: /DATA/Carol
   B. Clean up and print
      1. Get rid of garbage
      2. Insert NP commands

4. Assignment: Log on to BBS
   A. Send mail to instructor
   B. Pickup mail
   C. Print out E-mail & bring to next session

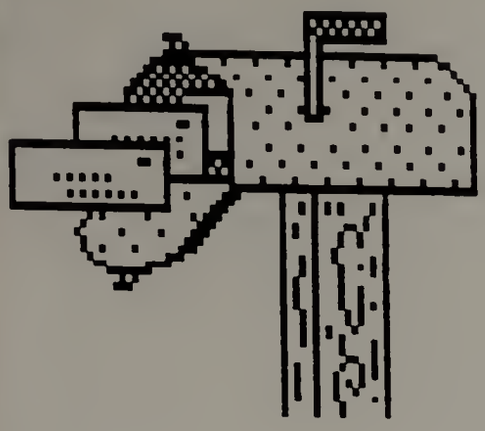
LESSON 4 REMOTE TO REMOTE

Handouts:
8 Terminal Characteristics
9 Remote to Remote

1. Demonstration
   A. Reset software set up
      Handout #8
   B. Call remote computer at Bartlett School
      Handout #9

3. Hands-on: teacher to teacher on-line chat
   a. Arrange for meeting time at other school

4. Assignment: Practice during the week - log on and send mail to any/all of the teachers on the system.



TELECOMMUNICATIONS

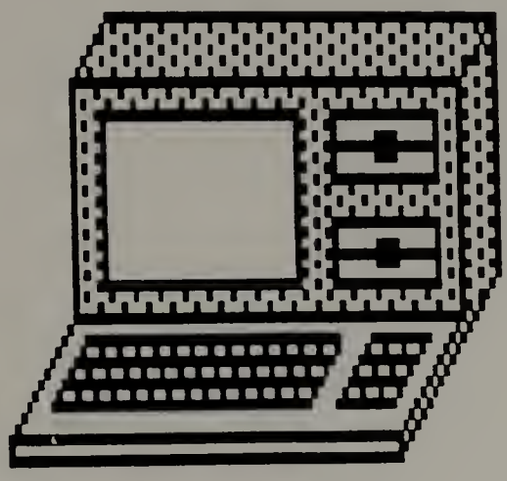


Table of Contents

Definition of Terms

Baud

A modem's speed, called its baud rate, is essentially a measurement of the relative rate at which it transmits data down a phone line. The two most common baud rates are 300 baud and 1200 baud, which translate to roughly 30 and 120 characters per second (Lambert, 1985). For purposes of comparison, text sent to your computer screen at 300 baud will be displayed slowly enough to read as it scrolls past. At 1200 baud, you can't keep up with it. Some of the newest modems are able to run at 2400 baud.

BBS

A Bulletin Board System (BBS) is usually a local computer which provides a place where public messages can be posted (just as the bulletin board in a supper market) and also have "mail boxes" where private mail can be left for other users of the BBS. There are 10 local BBS (that I know of) in the city of Nashua (and there are probably more). These BBS are run by individuals or organizations and are usually free.

Download

Downloading is the storage of information retrieved from another computer in a file on a disk. The main reason for downloading information is to print or read it off-line, when you aren't paying for the connection to the database.

Electronic messaging: E-Mail and Bulletin Boards

When information is sent to a host computer and stored there until the receiver calls in to read it, the process is called messaging. Private messages are known as Electronic mail or E-Mail, while public messages are known as bulletins. There are many large bulletin boards as well as many small local bulletin boards around the country. An example of a small local bulletin board would be one run within the local school district for use by students and teachers.

Information Services

Information services are vendors which offer a combination of information and services. CompuServe and The Source are the largest information services in this country. Using one of these services users are able to make airline reservations, shop for a new car, conduct research using on-line databases, get the latest news and weather reports, attend a conference (several people talking to one-another--similar to a conference phone call), or leave a message for a friend.

Logging-on

Logging on is the process of calling (dialing a phone number) and entering your password which connects your computer with the computer you are calling. Logging off disconnects your computer from the computer you had been talking to.

Modem

A modem is an essential peripheral device which allows a computer to transmit and receive information over phone lines. It converts the electrical impulses used to store information in computer's memory to sounds that can be transmitted over the telephone line, and converts

sounds received over the phone line back to electrical impulses that the computer can understand. It MOdulates and DEModulates. Modems come in a variety of shapes, sizes, and speeds, as well as prices. Basically there are two types: internal modems which are inside the computer and out-of-sight; and external modems which are outside the computer and therefore easily moved to other computers.

Network

In computer usage, the term Network is applied to three different types of connections. The two types of networks which use phone lines are public and private. There is a third type which does not use phone lines but has its own wiring. This study is not concerned with this last type of network, but it is explained to avoid confusion.

1. The public networks include GTE's Telenet and Tymshare's Tymnet among others. These computers act as an answering service and switchboard. They are located in most cities and thus enable you to connect with an information service by means of a local phone call.
2. A private network, on the other hand, has computers that take calls from a select clientele. Usually these callers do business directly with the company that has established the network.
3. Local Area Networks (LANs) are usually a group of computers within the same building which are connected through its own wiring, and the distances between computers is much shorter that those networks using telephone lines.

Telecommunications

In the realm of computers, telecommunications refers to the electronic exchange of information between distant computers.

Upload

Uploading is the opposite of downloading--you are sending a file which is stored on your disk to a remote computer. Uploading also avoids online connect charges: You can write your message offline, store it on a disk, go online, and then upload the file faster than you could type it while paying a connect charge.

Videotext

The generic term for receiving and sending textual information on a video screen.

Logging On to BBS

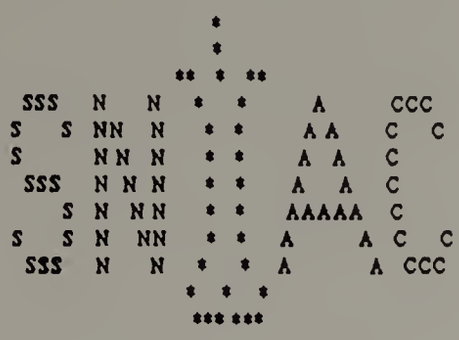
SOFTWARE: Apple Access IIe

STEP 1: Start-up Program

GET: Main Menu

STEP 2: Select: 1. Dial a Service

STEP 3: Select: 1. SNAC



Southern New Hampshire Apple Core

Welcomes You to...

SNAC-LINE

User Number ('New'=New User)
—>

STEP 4-A: Type: New (in the future type your number)

At this point the BBS will ask you several questions to sign yo u up as a user.

Name: Apple Hill Eastman
From: Nashua, NH

The BBS will assign you a

PASSWORD_____ WRITE IT DOWN!
The password is suppose to be kept secret but you will need it each time you log on to SNAC.

STEP 4-B: User Number ('New'=New User)
—>

(ENTER: Your # and PASSWORD)

Enter Password
X's will be echoed
—>

STEP 5: Command (?=Help): Type: T
Terminate Connection
Are you Sure?

Preparing Files to Email

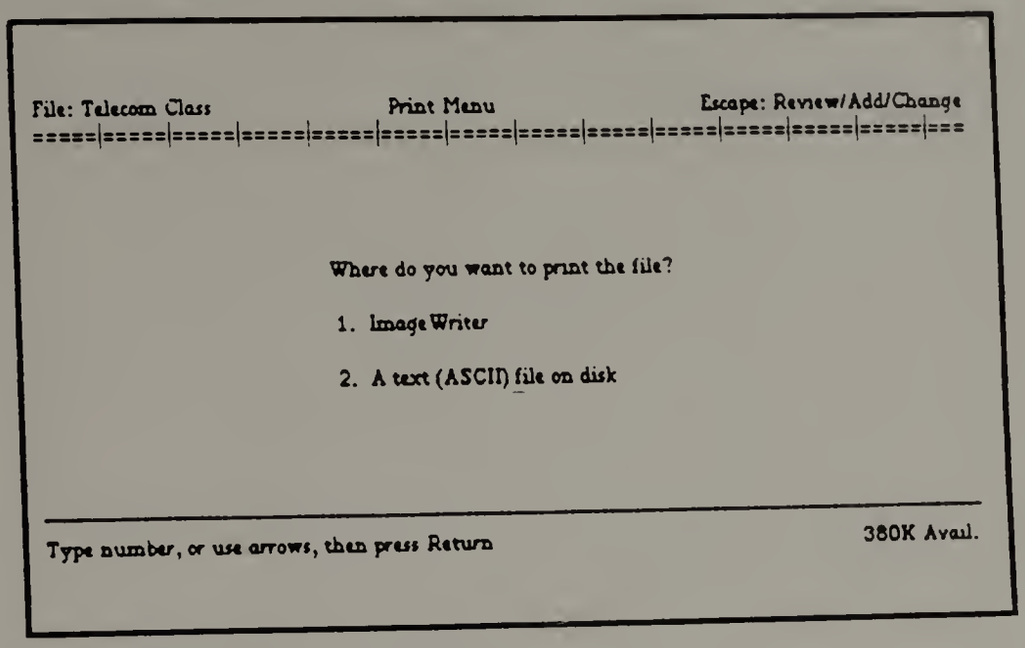
SOFTWARE: AppleWorks

PREPARING FILES TO BE SENT (MAILED)

STEP 1: Get file (letter/s) on desk top

STEP 2: Type: OPEN APPLE - P (PRINT)

STEP 3: Print Menu - Select:



STEP 4: Asks for: Pathname?

The PATHNAME consists of: Disk name + File name

Sample: /Data/Willy

****

IF YOU DON'T REMEMBER:

1. The disk name:

   A It is printed on screen each time you ADD FILES TO THE DESK TOP.

   B. WRITE IT on the disk label and you won't have this problem.

2. The file name: go to MAIN MENU
   A. SELECT: 5. Other Activities
   B. Next SELECT:
      2. List all files on the current disk drive.

      Files listed as "OTHER" are ASCII text files

Recording File

The recording file is the file in which you save information sent you by the other computer. You must give the recording file a ProDOS pathname which begins with a slash (/), followed by a disk name, followed by another slash, followed then by the filename.

```
Main Menu
1. Dial a Service
2. Terminal Mode
3. Set Up Communications
4. Transmit a File
5. Receive a File
6. Utilities
7. Help
8. Quit
```

STEP 1: From the Main Menu SELECT:
3. Set Up Communications

STEP 2: From the Set Up Menu SELECT:
7. CLose the Recording File and Open a New One

```
Main Menu
Set Up Menu
1. Terminal Characteristics
2. Set Speed
3. Set Parity
4. Set Answerback
5. Set Tab Stops
6. Enter Auto Dial Numbers
7. Close the Recording File and Open a New One
8. Save the Current ACCESS Configuration
```

STEP 3: Filename?
Enter complete pathname. SAMPLE: /Data/MAR1

Since you often do not know what the topic or content of this file will be, it is a good idea to use the date or day of the week as your file name.

NOTE: THIS AREA CAN BE A KIND OF PURGATORY! Note at the top of the screen: No ESC is permitted.

If you should get here by mistake or if you don't know what to type, type TEMP and press RETURN to get out.

STEP 4: ESC to Main Menu

Uploading Email

SOFTWARE: Apple Access II

STEP 1: Log on to BBS

STEP 2: ON SNAC BULLETIN BOARD:
Telling BBS you want to Send mail

1. COMPUTER: Command (?-Help): YOU TYPE: S
2. COMPUTER: Asks for #, YOU TYPE: # you want to send mail to
3. COMPUTER: You want to send to Willy Nilly? YOU TYPE: Y
4. WAIT: for 2 lines of "stuff" from computer YOU TYPE: OPEN APPLE - ESC
(This puts you back on YOUR software MAIN MENU.)

STEP 3: UP-LOADING YOUR MAIL

1. Use down arrow to highlight: 4. Transmit a File RETURN

```
:-------------------:
:    Main Menu      :-------------------------:
:                                              :
:  1. Dial a Service                           :
:  2. Terminal Mode                            :
:  3. Set Up Communications                    :
:  4. Transmit a File                          :
:  5. Receive a File                           :
:  6. Utilities                                :
:  7. Help                                     :
:  8. Quit                                     :
:                                              :
:----------------------------------------------:
```

2. COMPUTER: File name?
YOU TYPE: /Data/Willy (/Disk name/file name)

3. COMPUTER: Protocal N
COMPUTER: Delay on line TYPE: 10
COMPUTER: Delay on character TYPE: 50
COMPUTER: Ready to start Transmitting? TYPE: Y

4. COMPUTER: Transmission completed: TYPE: RETURN

5. MAIN MENU Select: 2. Terminal Mode

6. TERMINAL MODE (Paragraph at top of screen)
YOU TYPE: DONE

7. COMPUTER: Edit? YOU TYPE: S (to send) or
A (to abort)

Downloading Email

STEP 1: Log on to BBS

COMPUTER: You have mail waiting!
COMPUTER: Read it now?

STEP 2: Turn on RECORDING:

COMPUTER: Read it now?
YOU TYPE: OPEN APPLE - R

* The cursor blinks on and off if recording is on.

* The data is temporarily stored in the BUFFER. If the document you are recording fills the buffer, it will automatically be put into your recording file on your data disk.

STEP 3: Tell BBS you want to Read mail.

COMPUTER: Read it now?
YOU TYPE: Y

STEP 4 COMPUTER:

[A]UTO REPLY, [C]CONTINUE, [R]e-read

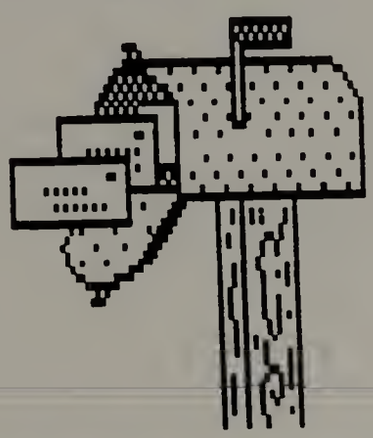
YOU TYPE: C (To make sure you get all of your mail.)

STEP 5: After all mail has been READ: TURN OFF RECORDING: OPEN APPLE - R

By turning off recording, anything that remains in the buffer is then put into the recording file. You could LOOSE MAIL if you turn off Access II without turning off recording first!

STEP 6: Terminate Connection:

COMPUTER: Command (?=Help):
YOU TYPE: T (to Terminate connection)

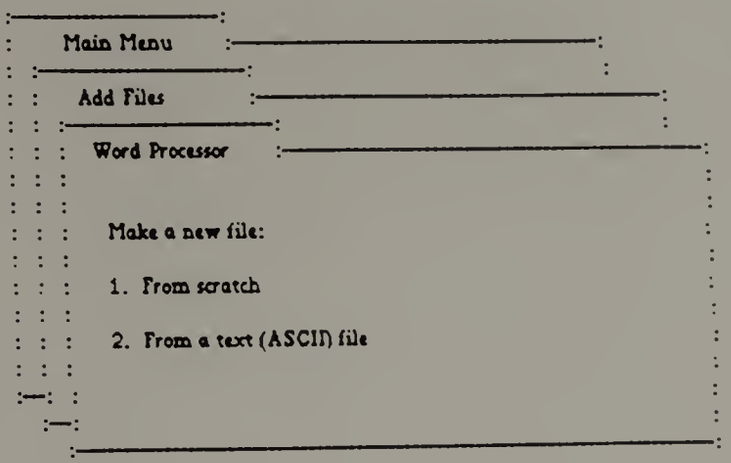


ASCII to Appleworks

SOFTWARE: Appleworks

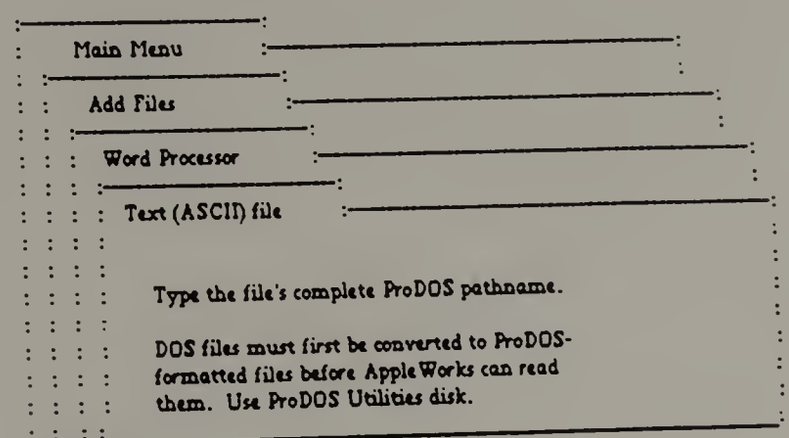
SELECT: SCREEN 1: Add files to the Desktop

SCREEN 2: Make a new file for
3. Word Processor



SCREEN 3: Word Processor

Make a new file:
2. From text (ASCII) file



Pathname?

SCREEN 4: Text (ASCII) file

Bottom of screen type Pathname? SAMPLE: /DATA/MAR2

(Pathname consists of disk name + name of recording file you're trying to bring up on desk top)

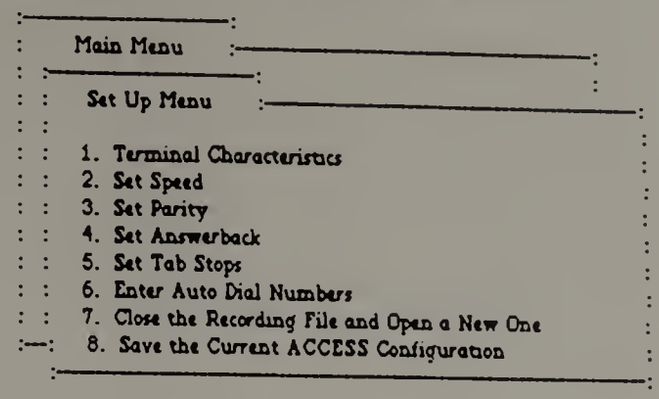
SCREEN 5: Type a name for this new file

SAMPLE: MAR2
(You can use the recording file name or what ever you like.)

Terminal Characteristics

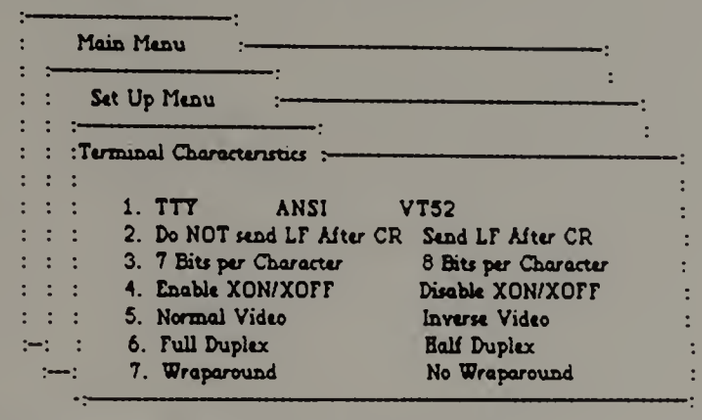
STEP 1: Go to Set Up Menu

1. SELECT: 1. Terminal Characteristics

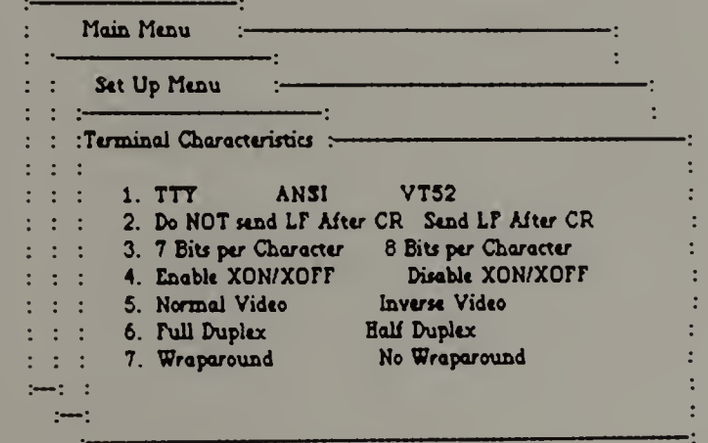


STEP 2: Select Appropriate Settings:

1. Terminal Characteristics for use with BBS



2. Terminal Characteristics for Remote to Remote



Remote to Remote

PLAN AHEAD:

1. Who is placing call & who is receiving call
2. At what time are you calling?

COMPUTER PLACING THE CALL:

STEP 1: Set UP Terminal Characteristics
(See handout: Terminal Characteristics)

STEP 2: Go back to Main Menu & SELECT:
1. Dial a Service (same as calling BBS)

STEP 3: SELECT: 2. NAME OF SCHOOL

STEP 4: You will hear computer dialing. Wait for other computer to answer.

COMPUTER RECEIVING CALL:

STEP 1: Set UP Terminal Characteristics
(See handout: Terminal Characteristics)

STEP 2: Go back to Main Menu & Select:
2. Terminal Mode

STEP 3: Set Modem to Auto-Answer: ATS0=2

(When you type these letters you will get an echo (AATTSS00==22) IT'S OK! Once the other modem connects everything will be fine.)

STEP 4: Receiving the call you will see the following:

RING

RING

CONNECT

STEP 5: Acknowledge the call: Say "Hi" and start talking.

TO END CALL:

STEP 1: BOTH parties say BYE

STEP 2: ONE party Hangs UP: +++ATH0

----------< ELECTRONIC MESSAGING >----------

PART ONE

AN INTRODUCTION TO ELECTRONIC MAIL

HOW ELECTRONIC MAIL WORKS

Instead of creating a message on a typewriter and typing it onto a piece of paper, the sender keys the text into a device which translates it into electronic format and sends it to the intended recipient.

THE BEGINNINGS

Thus the BIRTH OF EMAIL is often set at May 24th, 1844 when Samuel Morse demonstrated his first crude telegraph device. This was the first transmission of textual messages over wires. The fragile copper telegraph wire was the first step toward the electronic community and ....the global village.

Not until recently did ELECTRONIC MAIL become a readily accessible

<< business tool >>
and
<< personal convenience >>.

Electronic mail is now a major factor in the telecommunications world and a truly <<SOFT TECHNOLOGY>>. A Soft Technology requires a minimum of technical knowledge on the part of the user, uses little of the nonrenewable resources, and requires only a small capital investment.

THE GROWTH OF ELECTRONIC MAIL

The use of electronic mail is already widespread. Its potential is remarkable, considering how much time we all spend in communications related activities. In 1982 the United States Postal Service delivered more than 113 billion pieces of mail to over 80 million delivery stops. This phenomenon, coupled with the inability of traditional delivery services to keep up with mail volume, and decreasing costs of new technologies-- will be the driving force behind the acceptance of electronic mail as a major communications medium in this country.

SOME STATISTICS

* By the end of 1982 there were between 150,000 and 200,000 electronic mailboxes in use (including remote access commercial systems as well as in house systems). This is business involvement alone!

* A 1983 world market report showed that the market for electronic mail services was expected to reach 5 billion dollars by the end of 1985.

* In 1984, computer using businessmen sent more than 100 million electronic messages through the computers of EMS companies like Western Union, ITT, General Electric, MCI. This is DOUBLE the number of messages sent the previous year.

* By 1987, more than 3 million mailboxes were expected to be functioning. This rapid growth will escalate for the following reasons:

1. the need for faster and more efficient communications services;

2 the increased availability of personal computers and other communicating devices in the office.

APPENDIX B

INSTRUMENTS

Telecommunications Network Project

Name _____

School _____

Present Teaching Assignment _____

Curriculum Content Responsibilities: _____

_____

Other School Responsibilities: _____

_____

Years of Teaching Experience:_____

Years Teaching at this School: _____

Years Teaching with Present Assignment:_____

Degrees:_____

Completed Prior to Teaching: _____

Completed Since First Teaching: _____

In Progress: _____

THANK YOU FOR TAKING THE TIME TO COMPLETE THIS

Telecommunications Project Winter 1989

COMPUTER BACKGROUND QUESTIONNAIRE

Previous Experiences in Computer Education

Part A. Personal Learning

Do you use a computer in school and/or at home? _____

If so, how often do you use a computer?

_____rarely _____often _____daily

How many computer workshops/courses have you attended in the last 5 years?

____0 ____1-3 ____4-7 ____8-10 ____11+

How many workshops/courses have you attended in the last year?

____0 ____1-3 ____4-7 ____8-10 ____11+

Do you know how to use Appleworks word processing, including: start-up of program, writing document, and saving to disk? _____

If yes, how often do you use Appleworks word processing?

_____ seldom - to once a month

_____ once or twice a week

_____ just about every day

Do you know what a modem is? _____

Have you used telecommunications?

_____ personally

_____ with students

Please describe key elements from your previous informal learning about or with computers, including non-school activities:

_____ own a computer

_____ use a computer on a rotating system with my class for games or drill and practice

_____ self taught word processing

_____ self taught telecommunications

_____ never operated a computer with a disk drive

_____ other: _____

_____

How would you classify your knowledge of computers?

_____none

_____beginner

_____can do what I need

_____have taught others

_____expert

Part B: Teaching with or about computers

Have you ever used computers with students in school? _____

If so, was the experience provided for:

_____ all students

_____ only more able

_____ only the slow learners

_____ reward for behavior or work completed

How often do students use the computer?

_____ rarely _____ often _____ daily

Could you describe the manner in which the students used the computers?

_____ Drill and practice

_____ games

_____ Print Shop type programs

_____ programming BASIC or Logo

_____ word processing: ____Bank Street _____Appleworks

_____ data base: _____Appleworks _____other

_____ telecommunications, describe _____

_____

_____ other: _____

Part C: Introduction of Innovation at the School

What help/support is given by your Principal for inservice projects or ideas for innovations?

_____

_____

_____

Has there previously been any alteration in School procedures to support new practices?

_____

_____

Have you been working on any new content or instructional practices yourself this past year?

_____

_____

Did you choose _____ (or were you pressured _____) to become involved in this project?

How do you rate your colleagues' interest/involvement in investigating and implementing possible changes and innovations relating to computers?

_____ Highly uninterested

_____ Uninterested

_____ Neutral

_____ Interested

_____ Highly interested

THANK YOU FOR TAKING THE TIME TO COMPLETE THIS

TELECOMMUNICATIONS LOG

Name _____

User #: _____

Password: _____

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
Monday								
Tuesday								
Wednesday								
Thursday								
Friday								

Each time you use telecommunications, enter the length of time you were online.
The BBS will give you this as you log-off.
If you are not using the BBS, you will have to time yourself.
If you use the system more than once a day, please keep track of each time.

TELECOMMUNICATIONS INSERVICE EVALUATION

Instructions: Please take about 20 minutes of your time to fill out the form. It is designed to help us assess the quality and effectiveness of the inservice, and to improve it. All responses will be confidential. Only summary statistical data and responses that cannot be used to identify specific participants will be reported.

In the following questions, a response of 1 indicates that you strongly disagree with the statement, while a response of 5 indicates that you strongly agree with the statement. A response of 3 is neutral.

	Disagree Agree
1. I feel more competent with computers than I did at the start of this workshop.	1 2 3 4 5
2. My students have increased their classroom use of computers as a result of this workshop.	1 2 3 4 5
3. Lack of student access to computers is the greatest block to my integrating computers into the curriculum.	1 2 3 4 5
4. I can see ways to integrate telecommunications into my curriculum.	1 2 3 4 5
5. I have been able to interest other teachers in what we have been doing in these workshops.	1 2 3 4 5
6. As a result of this workshop I will increase my instructional use of computers with my students.	1 2 3 4 5
7. Too much information was presented during the sessions to absorb comfortably.	1 2 3 4 5
8. Time should be spent exploring practical problems like getting students to the computers.	1 2 3 4 5
9. I have learned a great deal about computers from other participants in the inservice.	1 2 3 4 5
10. The written materials clearly explain how to move through the process of telecommunications.	1 2 3 4 5
11. I am not convinced that computers will increase student achievement in my class.	1 2 3 4 5
12. I now talk more to other teachers about computers than I did at the start of the workshop.	1 2 3 4 5
13. Money for computers should be shifted from other areas of the school budget.	1 2 3 4 5

14. The greatest block to my using computers in the classroom is my philosophical disagreement with their worth. 1 2 3 4 5

15. The information presented in the sessions is relevant to my classroom. 1 2 3 4 5

16. This workshop has lived up to my expectations. 1 2 3 4 5

17. The progress of the workshop is faster than I would have liked. 1 2 3 4 5

18. Lack of teacher access to computers is the greatest block to my using computers. 1 2 3 4 5

19. I feel more comfortable using computers with my students than I did at the start of the workshop. 1 2 3 4 5

20. I found it easy to get access to a computer between sessions to work on assignments. 1 2 3 4 5

21. The progress of the workshop is slower than I would have liked. 1 2 3 4 5

22. I would recommend this workshop to other teachers 1 2 3 4 5

23. Learning the mechanics of using the computer is more the responsibility of the individual teacher (via working outside of the workshop) than it is of the workshop facilitator during workshop sessions. 1 2 3 4 5

Instructions: The following questions can be answered Yes or No. Please circle your choice.

24. I am a reasonably competent touch typist. Yes No

25. I was familiar with Appleworks word processing before the start of the workshop. Yes No

26. The bulk of the material we have covered was familiar to me before the start of the workshop. Yes No

27. I have spent more time watching others use the computer in the workshop than I have spent in using it myself. Yes No

28. I felt pressure to attend this workshop from other sources. Yes No

29. I have increased my understanding of how to use computers as a problem solving tool as a result of this workshop. Yes No

Instructions: Please provide brief responses to the following questions. Use the back of the page if necessary.

30. What is the most positive aspect of the workshop?

31. Has the workshop been organized in a way that facilitated learning? If not, how can it be improved?

32. Any other comments you would like to make would be appreciated.

CONCERNS QUESTIONNAIRE

Name (Optional) _____

Date Completed _____

It is very important for continuity in processing this data that we have a unique number that you can remember. Please use:

Last 4 digits SS# ____ ____ ____ ____

The purpose of this questionnaire is to determine what people who are using or thinking about using various programs are concerned about at various times during the innovation adoption process. The items were developed from typical responses of school and college teachers who range from no knowledge at all about various innovations to many years experience in using them. Therefore, a good part of the items may appear to be of little relevance or irrelevant to you at this time. For the completely irrelevant items, please circle "0" on the scale. Other items will represent those concerns you do have, in varying degrees of intensity, and should be marked higher on the scale, according to the explanation at the top of each of the following pages.

For example:

0 1 2 3 4 5 6 7 This statement is very true of me at this time.
0 1 2 3 4 5 6 7 This statement is somewhat true of me now.
0 1 2 3 4 5 6 7 This statement is not at all true of me at this time.
0 1 2 3 4 5 6 7 This statement seems irrelevant to me.

Please respond to the items in terms of your present concerns, or how you feel about your involvement or potential involvement with TELECOMMUNICATIONS. We do not hold to any one definition of this innovation, so please think of it in terms of your own perception of what it involves. Since this questionnaire is used for a variety of innovations, the name TELECOMMUNICATIONS never appears. However, phrases such as "the innovation," "this approach," and "the new system" all refer to TELECOMMUNICATIONS. Remember to respond to each item in terms of your present concerns about your involvement or potential involvement with TELECOMMUNICATIONS.

Thank you for taking time to complete this task.

A.2 SoC QUESTIONNAIRE ITEMS

0 1 2 3 4 5 6 7
Not true of me now Somewhat true of me now Very true of me now

0 1 2 3 4 5 6 7	I am concerned about students' attitudes toward this innovation.
0 1 2 3 4 5 6 7	I now know of some other approaches that might work better.
0 1 2 3 4 5 6 7	I don't even know what the innovation is.
0 1 2 3 4 5 6 7	I am concerned about not having enough time to organize myself each day.
0 1 2 3 4 5 6 7	I would like to help other faculty in their use of the innovation.
0 1 2 3 4 5 6 7	I have a very limited knowledge about the innovation.
0 1 2 3 4 5 6 7	I would like to know the effect of reorganization on my professional status.
0 1 2 3 4 5 6 7	I am concerned about conflict between my interests and my responsibilities.
0 1 2 3 4 5 6 7	I am concerned about revising my use of the innovation.
0 1 2 3 4 5 6 7	I would like to develop working relationships with both our faculty and outside faculty using this innovation.
0 1 2 3 4 5 6 7	I am concerned about how the innovation affects students.
0 1 2 3 4 5 6 7	I am not concerned about this innovation.
0 1 2 3 4 5 6 7	I would like to know who will make the decisions in the new system.
0 1 2 3 4 5 6 7	I would like to discuss the possibility of using the innovation.
0 1 2 3 4 5 6 7	I would like to know what resources are available if we decide to adopt this innovation.
0 1 2 3 4 5 6 7	I am concerned about my inability to manage all the innovation requires.
0 1 2 3 4 5 6 7	I would like to know how my teaching or administration is supposed to change.
0 1 2 3 4 5 6 7	I would like to familiarize other departments or persons with the progress of this new approach.

0 1 2 3 4 5 6 7
Not true of me now Somewhat true of me now Very true of me now

0 1 2 3 4 5 6 7	I am concerned about evaluating my impact on students.
0 1 2 3 4 5 6 7	I would like to revise the innovation's instructional approach.
0 1 2 3 4 5 6 7	I am completely occupied with other things.
0 1 2 3 4 5 6	I would like to modify our use of the innovation based on the experiences of our students.
0 1 2 3 4 5 6 7	Although I don't know about this innovation, I am concerned about things in the area.
0 1 2 3 4 5 6 7	I would like to excite my students about their part in this approach.
0 1 2 3 4 5 6 7	I am concerned about time spent working with nonacademic problems related to this innovation.
0 1 2 3 4 5 6 7	I would like to know what the use of the innovation will require in the immediate future.
0 1 2 3 4 5 6 7	I would like to coordinate my effort with others to maximize the innovation's effects.
0 1 2 3 4 5 6 7	I would like to have more information on time and energy commitments required by this innovation.
0 1 2 3 4 5 6 7	I would like to know what other faculty are doing in this area.
0 1 2 3 4 5 6 7	At this time, I am not interested in learning about this innovation.
0 1 2 3 4 5 6 7	I would like to determine how to supplement, enhance or replace the innovation.
0 1 2 3 4 5 6 7	I would like to use feedback from students to change the program.
0 1 2 3 4 5 6 7	I would like to know how my role will change when I am using the innovation.
0 1 2 3 4 5 6 7	Coordination of tasks and people is taking too much of my time.
0 1 2 3 4 5 6 7	I would like to know how this innovation is better than what we have now.

LEVELS OF USE INTERVIEW QUESTIONS

Are You using telecommunications?

IF YES

What do you see as the strengths and weaknesses of telecommunications in your situation?

Have you made any attempt to do anything about the weaknesses?

Are you currently looking for any information about telecommunications?

What kind? For what purpose?

Do you ever talk with others about telecommunications?

What do you tell them?

What do you see as being the effects of telecommunications?

In what way have you determined this?

Are you doing any evaluating, either formally or informally, of your use of telecommunications?

Have you received any feedback from students?

What have you done with the information you get?

Have you made any changes recently in how you use telecommunications?

What? Why? How recently?

Are you considering making any changes?

As you look ahead to next fall, what plans do you have
in relation to your use of telecommunications?

Are you working with others (outside of the teachers in this project) in your use of telecommunications?

Have you made any changes in your use of telecommunications based on this coordination?

Are you considering or planning to make major modifications or replace telecommunications at this time?

LoU V Probes

How do you work together?

How frequently?

What do you see as the strengths and the weaknesses of this collaboration?

Are you looking for any particular kind of information in relationto this collaboration?

When you talk to others about your collaboration, what do you share with them?

Have you done any formal or informal evaluation of how your collaboration is working?

What plans do you have for this collaborative effort in the future?

IF NO

Have you made a decision to use telecommunications in the future? If so when?

Can you describe telecommunications for me as you see it?

Are you currently looking for any information about telecommunications?

What kinds? For what purposes?

What do you see as the strengths and weaknesses of telecommunications for your situation?

At this point in time, what kinds of questions are you asking about telecommunications? Give examples if possible.

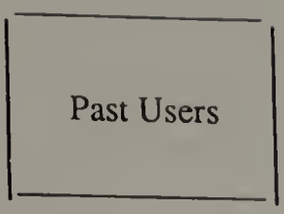
Do you ever talk with others and share information about telecommunications?

What do you share?

What are you planning with respect to telecommunications?

Can you tell me about any preparation or plans you have been making for the use of telecommuni- cations?

Can you summarize for me where you see yourself right now in relation to the use of telecommunications?



Why did you stop using telecommunications?

Can you describe for me how you organized your use of telecommunications?

What problems you found, what its effects appeared to be on students?

When you assess telecommunications at this point in time, what do you see as the strengths and weaknesses for you?

Loucks, S., Newlove, B., & Hall, G. Measuring Levels of Use of the Innovation: A Manual for Trainers, Interviewers, and Raters. Austin, TX: University of Texas, Research & Development Center for Teacher Education, 1976.

LEVELS OF USE

SCALE POINT DEFINITIONS OF THE LEVELS OF USE OF THE INNOVATION

Levels of Use are distinct states that represent observably different types of behavior and patterns of innovation use as exhibited by individuals and groups. These levels characterize a user's development in acquiring new skills and varying use of the innovation. Each level encompasses a range of behaviors, but is limited by a set of identifiable Decision Points. For descriptive purposes, each level is defined by seven categories.

	CATEGORIES		
	KNOWLEDGE **That which the user knows about characteristics of the innovation, how to use it, and consequences of its use. This is cognitive knowledge related to using the innovation, not feelings or attitudes.**	**ACQUIRING INFORMATION** **Solicits information about the innovation in a variety of ways, including questioning resource persons, corresponding with resource agencies, reviewing printed materials, and making visits.**	**SHARING** **Discusses the innovation with others. Shares plans, ideas, resources, outcomes, and problems related to use of the innovation.**
LEVEL 0 NON-USE State in which the user has little or no knowledge of the innovation, no involvement with the innovation, and is doing nothing toward becoming involved.	Knows nothing about this or similar innovations or has only very limited general knowledge of efforts to develop innovations in the area.	Takes little or no action to solicit information beyond reviewing descriptive information about this or similar innovations when it happens to come to personal attention.	Is not communicating with others about the innovation beyond possibly acknowledging that the innovation exists.
DECISION POINT A	*Takes action to learn more detailed information about the innovation.*		
LEVEL I ORIENTATION: State in which the user has acquired or is acquiring information about the innovation and/or has explored or is exploring its value orientation and its demands upon user and user system.	Knows general information about the innovation such as origin, characteristics, and implementation requirements.	Seeks descriptive material about the innovation. Seeks opinions and knowledge of others through discussions, visits, or workshops.	Discusses the innovation in general terms and/or exchanges descriptive information, materials, or ideas about the innovation and possible implications of its use.
DECISION POINT B	*Makes a decision to use the innovation by establishing a time to begin.*		
LEVEL II PREPARATION: State in which the user is preparing for first use of the innovation.	Knows logistical requirements, necessary resources and timing for initial use of the innovation, and details of initial experiences for clients.	Seeks information and resources specifically related to preparation for use of the innovation in own setting.	Discusses resources needed for initial use of the innovation. Joins others in pre-use training, and in planning for resources, logistics, schedules, etc., in preparation for first use.
DECISION POINT C	*Begins first use of the innovation.*		
LEVEL III MECHANICAL USE: State in which the user focuses most effort on the short-term, day-to-day use of the innovation with little time for reflection. Changes in use are made more to meet user needs than client needs. The user is primarily engaged in a stepwise attempt to master the tasks required to use the innovation, often resulting in disjointed and superficial use.	Knows on a day-to-day basis the requirements for using the innovation. Is more knowledgeable on short-term activities and effects than long-range activities and effects of use of the innovation.	Solicits management information about such things as logistics, scheduling techniques, and ideas for reducing amount of time and work required of user.	Discusses management and logistical issues related to use of the innovation. Resources and materials are shared for purposes of reducing management, flow and logistical problems related to use of the innovation.
DECISION POINT D-1	*A routine pattern of use is established.*		
LEVEL IV A ROUTINE: Use of the innovation is stabilized. Few if any changes are being made in ongoing use. Little preparation or thought is being given to improving innovation use or its consequences.	Knows both short- and long-term requirements for use and how to use the innovation with minimum effort or stress.	Makes no special efforts to seek information as a part of ongoing use of the innovation.	Describes current use of the innovation with little or no reference to ways of changing use.
DECISION POINT D-2	*Changes use of the innovation based on formal or informal evaluation in order to increase client outcomes.*		
LEVEL IV B REFINEMENT: State in which the user varies the use of the innovation to increase the impact on clients within immediate sphere of influence. Variations are based on knowledge of both short- and long-term consequences for clients.	Knows cognitive and affective effects of the innovation on clients and ways for increasing impact on clients.	Solicits information and materials that focus specifically on changing use of the innovation to affect client outcomes.	Discusses own methods of modifying use of the innovation to change client outcomes.
DECISION POINT E	*Initiates changes in use of innovation based on input of and in coordination with what colleagues are doing.*		
LEVEL V INTEGRATION: State in which the user is combining own efforts to use the innovation with related activities of colleagues to achieve a collective impact on clients within their common sphere of influence.	Knows how to coordinate own use of the innovation with colleagues to provide a collective impact on clients.	Solicits information and opinions for the purpose of collaborating with others in use of the innovation.	Discusses efforts to increase client impact through collaboration with others on personal use of the innovation.
DECISION POINT F	*Begins exploring alternatives to or major modifications of the innovation presently in use.*		
LEVEL VI RENEWAL: State in which the user re-evaluates the quality of use of the innovation, seeks major modifications of or alternatives to present innovation to achieve increased impact on clients, examines new developments in the field, and explores new goals for self and the system.	Knows of alternatives that could be used to change or replace the present innovation that would improve the quality of outcomes of its use.	Seeks information and materials about other innovations as alternatives to the present innovation or for making major adaptations in the innovation.	Focuses discussions on identification of major alternatives or replacements for the current innovation.

Procedures for Adopting Educational Innovations Project, Research and Development Center for Teacher Education, University of Texas at Austin, 1975, N.I.E. Contract No. NIE-C-74-0087.

CATEGORIES

ASSESSING	PLANNING	STATUS REPORTING	PERFORMING
Examines the potential or actual use of the innovation or some aspect of it. This can be a mental assessment or can involve actual collection and analysis of data.	**Designs and outlines short- and/or long-range steps to be taken during process of innovation adoption, i.e., aligns resources, schedules activities, meets with others to organize and/or coordinate use of the innovation.**	**Describes personal stand at the present time in relation to use of the innovation.**	**Carries out the actions and activities entailed in operationalizing the innovation.**
Takes no action to analyze the innovation, its characteristics, possible use, or consequences of use.	Schedules no time and specifies no steps for the study or use of the innovation.	Reports little or no personal involvement with the innovation.	Takes no discernible action toward learning about or using the innovation. The innovation and/or its accouterments are not present or in use.
Analyzes and compares materials, content, requirements for use, evaluation reports, potential outcomes, strengths and weaknesses for purpose of making a decision about use of the innovation.	Plans to gather necessary information and resources as needed to make a decision for or against use of the innovation.	Reports presently orienting self to what the innovation is and is not.	Explores the innovation and requirements for its use by talking to others about it, reviewing descriptive information and sample materials, attending orientation sessions, and observing others using it.
Analyzes detailed requirements and available resources for initial use of the innovation.	Identifies steps and procedures entailed in obtaining resources and organizing activities and events for initial use of the innovation.	Reports preparing self for initial use of the innovation.	Studies reference materials in depth, organizes resources and logistics, schedules and receives skill training in preparation for initial use.
Examines own use of the innovation with respect to problems of logistics, management, time, schedules, resources, and general reactions of clients.	Plans for organizing and managing resources, activities, and events related primarily to immediate ongoing use of the innovation. Planned-for changes address managerial or logistical issues with a short-term perspective.	Reports that logistics, time, management, resource organization, etc., are the focus of most personal efforts to use the innovation.	Manages innovation with varying degress of efficiency. Often lacks anticipation of immediate consequences. The flow of actions in the user and clients is often disjointed, uneven and uncertain. When changes are made they are primarily in response to logistical and organizational problems.
Limits evaluation activities to those administratively required, with little attention paid to findings for the purpose of changing use.	Plans intermediate and long-range actions with little projected variation in how the innovation will be used. Planning focuses on routine use of resources, personnel, etc.	Reports that personal use of the innovation is going along satisfactorily with few if any problems.	Uses the innovation smoothly with minimal management problems, over time, there is little variation in pattern of use.
Assesses use of the innovation for the purpose of changing current practices to improve client outcomes.	Develops intermediate and long-range plans that anticipate possible and needed steps, resources, and events designed to enhance client outcomes.	Reports varying use of the innovation in order to change client outcomes.	Explores and experiments with alternative combinations of the innovation with existing practices to maximize client involvement and to optimize client outcomes.
Appraises collaborative use of the innovation in terms of client outcomes and strengths and weaknesses of the integrated effort.	Plans specific actions to coordinate own use of the innovation with others to achieve increased impact on clients.	Reports spending time and energy collaborating with others about integrating own use of the innovation.	Collaborates with others in use of the innovation as a means for expanding the innovation's impact on clients. Changes in use are made in coordination with others.
Analyzes advantages and disadvantages of major modifications or alternatives to the present innovation.	Plans activities that involve pursuit of alternatives to enhance or replace the innovation.	Reports considering major modifications of or alternatives to present use of the innovation.	Explores other innovations that could be used in combination with or in place of the present innovation in an attempt to develop more effective means of achieving client outcomes.

LEVEL OF USE RATING SHEET (CBAM, 1975)

Tape #: Site: Interviewer:
Date: / / 75 I.D. #: Rater:

Level	Knowledge	Acquiring Information	Sharing	Assessing	Planning	Status Reporting	Performing	Overall LoU
Non-Use	0	0	0	0	0	0	0	0
D.P. A Orientation	I	I	I	I	I	I	I	I
D.P. B Preparation	II	II	II	II	II	II	II	II
D.P. C Mechanical Use	III	III	III	III	III	III	III	III
D.P. D-1 Routine	IVA	IVA	IVA	IVA	IVA	IVA	IVA	IVA
D.P. D-2 Refinement	IVB	IVB	IVB	IVB	IVB	IVB	IVB	IVB
D.P. E Integration	V	V	V	V	V	V	V	V
D.P. F Renewal	VI	VI	VI	VI	VI	VI	VI	VI
User is not doing:	ND	ND	ND	ND	ND	ND	ND	
No information in interview:	NI	NI	NI	NI	NI	NI	NI	

Is the individual a past user? Yes No

How much difficulty did you have in assigning this person to a specific LoU? None 1 2 3 4 5 6 7 Very much

Comments about interviewer --

General Comments --

COMPUTER USE QUESTIONNAIRE

January 1990

TEACHER USE:

Are you using a computer more often than you did a year ago? _____

How often have you used a computer in the last two months?

_____ never

_____ rarely

_____ often

_____ daily

How often have you used a word processing program?

_____ seldom - to once a month

_____ once or twice a week

_____ just about every day

How often have you used telecommunications (personal practice or for student use)?

_____ never

_____ once or twice a month

_____ once or twice a week

_____ more than twice a week

Have you sent messages to other teacher on the BBS which were not concerned with your telecommunications curriculum? (Example: " I heard at a meeting that your school was without heat."

_____

STUDENT USE:

How often have your students used a computer in your classroom?

_____ never

_____ rarely

_____ often

_____ daily

How have your students used the computer?

_____ Drill and practice

_____ games

_____ Print Shop type programs (graphics)

_____ programming BASIC or Logo

_____ keyboarding

_____ word processing

_____ data base

_____ simulations (Snooper Troops, Carman Sandiego, etc.)

_____ telecommunications

Do your students know what a modem is? _____

Have your students seen the on-line use of telecommunications? _____

Have any of your students participated in the on-line use (Dialing the BBS, logging-on, sending a message, etc.) of telecommunications?

_____

If yes: How many students _____

How many times _____

FUTURE USE:

In what curriculum area would you be interested in using telecommunications?

_____

What would improve the use of telecommunications for you?

_____

_____

Would you be interested in telecommunicating with classes in Manchester?

_____

Would you be interested in setting up a telecommunications project for S.A.I.L. students after school?

_____

Please add any comments or feelings you have about telecommunications as they would be most helpful to us in making future plans.

THANK YOU.

APPLE HILL/BARTLETT TELECOMMUNICATIONS PROJECT

Since you are a part of the original telecommunications project, we are trying to find out what your needs or interests may be for future use of this technology.

It is recognized that telecommunications is complex and requires considerable practice and use before teachers feel comfortable with it. Most people are not ready to "go it alone" after attending a workshop, but need continued assistance and coaching when first using telecommunications. We are ready to provide all the assistance you need.

During the fall, six teachers were involved in using telecommunications in their social studies curriculum. We understand that you do not teach social studies and may be interested in integrating this technology in another curriculum area.

In what curriculum area would you be interested in using telecommunications?

_____

What would improve the use of telecommunications for you?

_____

_____

Would you be interested in telecommunicating with classes in Manchester?

_____

Would you be interested in setting up a telecommunications project for S.A.I.L. students after school? _____

Would you be interested in attending a workshop to review and improve your skills in this area? _____

_____ I am not interested in pursuing the use of telecommunications this school year.

_____ I would be interested using telecommunications in the future.

Please add any comments or feelings you have about telecommunications as they would be most helpful to us in making future plans.

THANK YOU

APPENDIX C

COMMUNICATIONS

741 Chestnut Street
Manchester, NH 03104
February 6, 1989

Mr. _____
Assistant Superintendent
_____ School District
Main Street
_____, NH 03060

Dear Mr. _____,

I am writing to request permission to conduct a Research Study of the innovative Telecommunications Project between Apple Hill and Bartlett Schools. The content theme of the Study centers upon inservice teacher training in telecommunications and its incorporation into elements of the elementary school curriculum. The proposed research plan would necessitate the collection of data and observation of the teachers practising their new skills with their students.

The Telecommunications Project will prepare the teachers through inservice education in the principles of word processing and telecommunications. The study I wish to conduct in conjunction with this Project will investigate how best to help teachers learn new content in computer education and use it in their classroom instruction.

This Study is part of my doctoral dissertation in education. Dr. Klaus Schultz is the Chairman of my dissertation committee at the University of Massachusetts at Amherst.

Hoping that you can assist me with my plans.

Sincerely yours,

Carol-Anne Eldridge

TELECOMMUNICATIONS PROJECT
INSERVICE STUDY

Description of Project

The Telecommunications Project is an innovative program funded by the _____ school District and involving the fourth and sixth grade classes at Apple Hill and Bartlett Schools. It will emphasize principles of computing and communication through the use of a telecommunications network linking the two schools. The Project is part of a study investigating how best to help teachers learn new content in computer education and then use it in their classroom instruction. This study has been approved by Mr._____, Assistant Superintendent of Schools in _____.

The inservice training will be conducted by lead teachers, Robert Goode and Carol-Anne Eldridge, in each building and it will primarily consist of training in the use of telecommunications with refresher instruction in the use of Appleworks word processing. The telecommunications workshops will be conducted during a three week period in March followed by a four-week implementation phase. In addition all of the teachers will meet together for a workshop to develop an initial set of cooperative activities in which the various classes will participate.

During the implementation phase the lead teachers will observe teachers once each week, and provide feedback and advice as they attempt to practice the new curriculum segments. In addition there will be a weekly conference for each group of teachers to review their experiences.

Benefits to Participants

Teachers will receive staff development credit for the training sessions. Since participants will be part of a group that is developing and evaluating a range of activities suitable for children they will gain a comprehensive file by the end of the program. Naturally teachers will have gained new skills in the use of the computer as a tool in the classroom. And they will receive support and feedback as they attempt to implement these new skills.

Organizational Details

- AppleWorks workshops during February as needed
- Telecommunications workshops during March
- Joint staff meeting to plan on-line activities for each class March 23rd
- Introductory "Hi" unit begins March 27th

Requirements for Participants

- Attendance and participation in the range of activities in the program, including preparation of several mini-lessons, and four classroom observations.
- Maintenance of a log recording use and problems in learning and teaching with this innovative tool.
- Completion of questionnaires.

Report of Findings

Results of this study will be incorporated within my doctoral dissertation. The anonymity of all participants is guaranteed; results will be reported in such a way that the identity of any single participant is impossible to determine.

Your Involvement

If you have any queries relating to the Project please do not hesitate to call me and I will do my utmost to answer your concerns. Your participation in this study will, I believe, be of mutual benefit to you and me. However, your participation is purely voluntary. If you are willing to participate, please sign below.

Informed Consent

I, _____, wish to participate in the Telecommunications Project Inservice Study to be conducted by Carol-Anne Eldridge as outlined.

Signed _____ Date _____

July 31, 1989

To All Participants in the Telecommunications Project:

You can log on to the new SNAC number:

424-0371

BEFORE you do:
You have to set up your software to dial that number.

Apple Access - Main Menu

Select: 3. Set Up Communications RETURN
Select: 6. Enter Auto Dial Numbers RETURN

1. Move the cursor so that it is next to SNAC and push the RETURN key.
2. At the bottom of the screen it will say: SNAC
   just push RETURN.
3. "Is this service name also a command file name?"
   (N is highlighted at end of line so just hit RETURN).
4. "Do you want to enter a phone # or a dialing macro (reply # or M)?
   (# is highlighted: RETURN).
5. Use arrow to put cursor at end of # and erase old # using delete key and then
   type in new # and RETURN.
6. Escape puts you back on Set Up Menu.
7. Go down to:
   8. Save the Current ACCESS Configuration.
      (and hit RETURN).
8. ESCAPE to get back to Main Menu

AND YOU ARE READY TO GO!

Logging on as a: NEW MEMBER
type NEW when it asks for your #

(Robert will be glad to know that you can pick your own password -- so you won't have to remember "crazy letters"!)
You may want to think about that before you dial and select a meaningful (SHORT) word that you will remember.

You can't have everything Robert! You still have to sit and watch the SNAC Logo at the beginning. It's going to ask you a bunch of questions like first name and last name, address etc. GIVE THE SAME INFO AS BEFORE: Apple Hill Brown & school number. But then it asks some questions that may be confusing to you. So here they are:

Type of computer? Apple IIe (EVEN FROM THE GS, Paula)
Size of screen? 80
Does your computer need line feed? Yes
Does your computer have destructive backspace? Yes
Use Beginner mode? Yes
HOT menu feature active? no

Remember to write down your NEW # and password - Don't worry the BBS reminds you to do that.

When you finish typing your message you don't type: DONE anymore. You have a choice between .S and *. I used .S to save mine -- I hope that means send also. I'm not sure what you get if you type * -- since I didn't do that. I was on long distance so I couldn't do a lot of investigating -- but you can. If you should get something different than I did don't be surprised as I was sending [F]eedback to Sysop and not regular E-mail. Also on the Main Menu you will find a section: [G]eneral Help, NEW USER. I suggest you turn on your recording (Open Apple R) and take a look at that and maybe print it out.

To get off the BBS you don't use T anymore either. You will see on the Main Menu it says [L]og off -- so you type L.

I didn't check out the [M]ail section -- because I knew I didn't have any mail and I couldn't send any mail because you people didn't have User #'s yet. I will check back in a week to see if you have gotten a number so I can send you mail on the new system.

MY NUMBER: 130

I did get your mail Linda at the old number. He just had that message because some people might not look at it for a month and then it would be gone. I'm not sure what happened at Paula's that you didn't get on -- try again.

HAVE FUN!

MAIN MENU of new BBS:

Main Menu
==========

[M]ail section	[C]hat with sysop
[P]ublic Messages	[R]eset terminal configuration
[D]ownloads	
	[*] Date and time
	[U]pdate Password
[L]ogoff	[G]eneral Help, NEW USER Info
[I]nternode chat	F]eedback to Sysop
	[O]ther BB

Certificate of Recognition

To

CAROL ELDRIDGE

For your Dedication and Commitment to the Telecommunication Program between and Elementary Schools

Presented this 9th day of April, 1990

Berard Masse
Superintendent of Schools

Elizabeth Brackett
Elizabeth Brackett, President
Board of Education

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